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INFORMATION PORTAL FOR WOMEN'S ORGANIZATION

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Abstract

This report describes the proposed Information Portal for Women's Organization developed for the PELITAWANIS TNB Organization, a women's organization established by Tenaga Nasional Berhad (TNB) to foster closer ties between the women work force and wives of the employees from all levels in TNB. The PELITAWANIS TNB Portal is for use by the members of the PELITAWANIS TNB Organization. This portal is a one-person project handled by the author. Therefore, the author is responsible for the development of all the system modules. Among the modules are search facilities, online registration, forum, bulletin board, member list and update, and user feedback. The purpose of this portal is to present information regarding the organization, its activities, members and services in an interesting manner and to make this information readily available to its members and other interested parties. It also facilitates information sharing besides encouraging interaction and communication between members. The portal also serves as an avenue for announcements regarding the organization. Other than that, it will also be possible to monitor the log ins of the members. The administrators of the portal can perform management tasks to update the contents of the portal and the member data. The Waterfall with Prototype model is chosen as the development methodology while the coding uses the bottom-up approach. The main development platform is the Microsoft SharePoint Portal Server. The PELITAWANIS TNB Portal of course will also undergo testing and evaluation after its completion. With the birth of the portal, it is hoped that this will encourage more women to use the facilities made available to enrich their knowledge and experience, particularly in the areas of information and communications technology.

Acknowledgements

I would like to take this opportunity to thank everyone who has helped me either directly or indirectly in the process of completing the system documentation to fulfill the requirements for WXES 3181. First and foremost, I would like to extend my gratitude to my supervisor, Assoc. Prof. Dr. Zainab Awang Ngah for her valuable advice, ideas and constructive criticism throughout the development of this system. Her expertise, knowledge and efforts have greatly influenced the development of this portal. I would also like to thank Mr. Ang Tan Fong, the moderator of the system for his constructive opinions, insights and guidance during the development of this project. The General Manager of Tenaga Nasional Berhad Generation (Prai Power Station), Mr. Mohd. Safian bin Haji Ismail also deserves a special mention here. His willingness to give me the opportunity to develop this portal is very much appreciated and without his consent, this project would not be possible. Next, I would like to express special thanks to the following individuals, Mr. Lee Song Chow, Puan Juriah and Puan Azmah of Tenaga Nasional Berhad Generation (Prai Power Station) for their assistance in collecting the relevant information crucial to the development of this system. Last but not least, special credit goes to my course mates and friends for their assistance, support and encouragement in the course of developing this system. Their kindness and continued affirmation has provided me with much determination and perseverance. Thank you.

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CHAPTER 1: INTRODUCTION

1.1 PROJECT OVERVIEW

This project focuses on the Information Portal for Women's Organization. Briefly, this means a Web site created for a women's organization, in this case the PELITAWANIS Organization. PELITAWANIS is the official women's group for the female staff and wives of the staff of Tenaga Nasional Berhad (TNB).

Firstly, the meaning of each word or phrase will be discussed here (Encarta, 2001).

Information

In the context of this project, information would take on the meaning of computer data that has been organized and presented in a systematic fashion to clarify the underlying meaning. Information in this context pertains to the organization, activities, services and members of PELITAWANIS.

Portal

For this project, the term portal (in the computing context) is a Web site that provides links to information and other Web sites.

Women

The women in this project refer primarily to the female staff and the wives of the staff of TNB.

Organization

Here, organization carries the meaning of a group of people, i.e. the women of TNB identified by their shared interests or purpose.

1.1.1 Significance of Portals to Women's Organizations

Women all over the world has struggled and fought for centuries to be recognized as equal citizens, workers, partners and human beings compared to men. They have since come a long way and more and more, women are being given the recognition and respect they deserve for their dedication, loyalty, perseverance and sheer determination to in their efforts to improve their lives and the lives of the people around them.

In the midst of adversity, women began to realize the importance of coming together to overcome whatever obstacles came their way. The strength that comes forth from a close-knit group of people working together towards a common goal is immeasurable and inspiring. They realized that when they were united, they could make their voices heard and they can make a positive difference in their lives and also change the circumstances surrounding them. Probably this is how women's organizations are born. Today, we have various women's organizations that are formed to address different needs and issues faced by our society in general, and women in particular.

Women in the workplace have issues and concerns that are unique to their working environment, the nature of their jobs and the relationship between the employers and employees. In Southeast Asia, there has been a steady rise in the rate of women's labor force

participation. The most dramatic rise in female labor was in Malaysia where only three percent of the labor force was female in 1960, rising to 34 percent in 1987 (Women in the workplace, 1993). Therefore, it is deemed appropriate and necessary to form organizations to look after the women worker's rights and to cater to their specific needs. There are numerous women's organizations in Malaysia that is set up specifically for a group of workers in the same company, such as the PELITAWANIS TNB Organization.

Women's organizations are constantly looking for ways to create awareness of their causes and concerns, and trying to reach out to more people who may be in need of their help. They are also always on the lookout for people and organizations who are able to lend a helping hand towards their struggles and causes, besides getting their members and interested parties more involved in their activities and the organization. In a nutshell, they need exposure.

The introduction of portals is one way of accomplishing the goals and targets of these women's organizations. Whether it's used as a way of disseminating information to their members, to make their presence felt on the Internet on a national or international scale, or to reach out to others in need, portals created for women's organizations can greatly help to make these goals a reality.

Therefore, in the author's opinion, the proposal to develop an information portal for the PELITAWANIS TNB Organization is highly suitable and will bring many benefits to the members of the PELITAWANIS TNB Organization and the people involved in this project.

1.2 PROJECT MOTIVATIONS

The tremendous growth and potential of the World Wide Web (WWW) has motivated many individuals and organizations to make their presence felt in the cyber world. Women's organizations are no different. The advantage of international reach and high level of accessibility, which enables interested parties to access information of their interest provided that they have the necessary equipment such as a personal computer with Internet access, is very appealing to many people.

Members of the women's organization, especially, will appreciate the convenience of being able to get the latest updates and news concerning the organization just by visiting the information portal at a time and place, which is most suitable for them. Interested parties who may be interested in joining the organization can also register on-line and this would encourage more people to support the organization.

Preliminary studies at the existing Web sites for women's organizations reveal that while most of the more prominent and active organizations have their own Web site or portal, not many are regularly updated and does not incorporate features that are appealing to users of the WWW in general and their target audience (the existing members and would-be members) in particular.

There is also a lack of portals that are truly created to satisfy women's needs and that provide useful information about the issues and topics that are close to the heart of women, especially in the Malaysian context.

Therefore, one of the motivations in developing this information portal for women's organization is to create a portal that is not only comprehensive and interesting in design and layout, but also appealing, up-to-date, and informative, with additional features such as search facilities, bulletin board and forum.

1.3 GOALS AND OBJECTIVES

This part of the introduction covers the main goals and objectives of developing this system or information portal.

1.3.1 Goals

This project aims to develop a portal that is comprehensive, appealing, practical, user-friendly and also up-to-date. This portal hopes to bring about positive changes in the lives of women who use the portal and to serve as a platform for communication, interaction, sharing of information, and to present it in a way that is simple and interesting. It is also to encourage more women to make use of the Internet and WWW to their advantage and to provide a portal that really caters to their needs and interests.

The PELITAWANIS movement in TNB forms the foundation that links the corporation to its women employees and employees' wives. It supports the aspiration of TNB to be a caring employer. The PELITAWANIS portal aims to indicate this role to the Malaysian society.

1.3.2 Objectives

This project hopes to realize the following objectives:

- To act as a platform for interaction and communication

This information portal is meant to serve as a platform for members to interact and communicate with each other in a new way, using the bulletin board and forum that would be made available in the portal via the SharePoint Portal Server.

- To be an avenue for announcements

Of course, one of the most fundamental purposes of this portal is to enable members to be updated about the activities and other going-ons in the association when they visit the organization's Web page or portal.

- To provide a basic minutes management system

A basic minutes management system will be incorporated into the portal for the use of the members.

- To present information regarding the organization in a more interesting manner

This portal will be an avenue for the organization to make their organization known to others in the cyber world and this information is regularly updated. Information regarding the organization's current activities will be a major part of the information included other than information about the organization itself.

- To provide links and search facilities

This portal will also provide links to topics that are of interest to women and also provide search facilities to the visitors and members.

- To conduct polls or surveys

Interesting polls concerning issues that are of interest to women is also included to give women an opportunity to vote and to gather information about their responses.

- To monitor the logging onto the Web site

An intelligent counter would be included so that reports could be generated on the total log-ins and from where.

1.4 PROJECT SCOPE

The scope of this project covers the basic functions of an information portal plus a few other applications or features that are thought suitable for a women's organization.

1.4.1 Project Modules

The author has identified five interdependent modules. These modules are as follows:

- Information Management (Administration)

Administrators of the site must be able to create, add, delete, modify, and update all of the information that is put on the Web site.

- Search

A search function serves to help users to find the information that they need. This search function is not only for searching for information that is provided in the Web site, but also information from other sources.

- Forum/Bulletin Board

Members can join any forum that is available in the Web site. They can also initiate the discussions. The forum takes place by placing notes and comments in the specific page

(bulletin board) or topic of discussion. The administrators will monitor and moderate the progress of the forums.

- Member List and Update

Users can view the current or latest member list by logging in to the portal. Administrators can update the member list from time to time to include the new members of the organization.

- User Feedback

Users are given the opportunity to voice their comments and suggestions regarding the portal and also other matters pertaining to the organization and its activities. The feedback will be channeled to the portal administrators and also the committee members of the organization for action.

1.5 PROJECT PLAN AND METHOD

This part of the introduction will explain the plans and methods chosen for this project. A development strategy that is also referred to as the software process model or the software engineering model is first incorporated into the project plan. A software process model is defined as a framework for the tasks that are required to build high quality software. It describes the way software development should progress and the way software development is done in actuality. As a result, it forms a common understanding of activities, resources and constraints that are involved. In addition, it helps to identify inconsistencies, redundancies and omissions so that the development process will become more effective and efficient (Pfleeger, 2001). This will ensure the project's success.

There are several popular software process models such as the Waterfall Model, V Model, Prototyping Model, Incremental Model, and the Spiral Model. There is no clear distinction as to which model is the 'best' model for all projects. All of the models proposed each have it's own strengths and weaknesses. Therefore, the suitability and appropriateness of the model depends very much on the nature of the project itself and also the preferences of the developer. Factors that can influence the choice of method used include resource availability, project complexity, requirements volatility and many others.

For this project, the Waterfall Model with Prototyping is chosen. This model is the combination of the Waterfall and Prototyping models, whereby using the characteristics and strengths of prototyping enhances the Waterfall method. Each phase in the software development is completed before the next stage begins. Prototyping can enhance the understanding of the software development process. A prototype is a partially developed product that enables customers and developers to examine some aspects of the proposed system and decide if it is suitable or appropriate for the finished product (Pfleeger, 2001). For example, the developer may develop the interface of the system and lets the user examine it to ensure that the requirements are consistent, feasible, and practical. Revisions and modifications done at this stage can save the cost of development, compared to when changes have to be done in the later stages of testing.

Two most important functions in the prototyping are verification and validation. Validation ensures that the system has implemented all of the requirements so that each system function

can be traced back to a particular requirement in the specification. Verification ensures that each function works correctly.

The rationale of choosing this method is that the author believes the systematic approach of the Waterfall method will guide the overall development of the system while the prototype will assist in getting user feedback and evaluation in the requirements stage. This is crucial to develop a quality system with the minimum cost and time, especially considering the fact that the users are quite far away from the developer most of the time. Therefore, prototypes are only used for some parts whereby the user feedback is needed and the rest of the time, the development continues in a step-by-step manner.

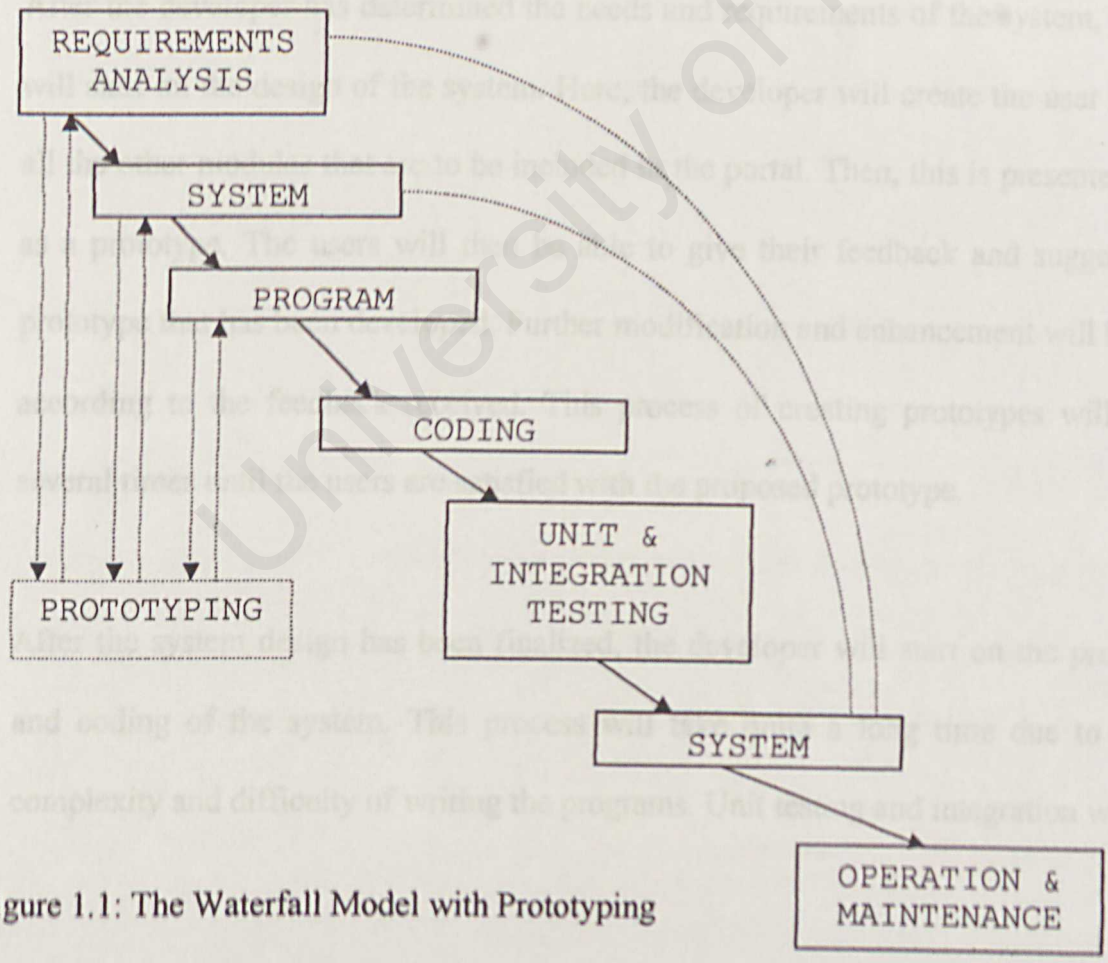


Figure 1.1: The Waterfall Model with Prototyping

Referring to Figure 1.1, requirements analysis in the context of this project includes the process of finding out the needs and requirements of the users of the portal. This is done through interviews with the people concerned, such as the staff and committee members of PELITAWANIS and also through the author's own observation. The author also did some research on the existing Web sites or portals for women's organizations to get a broader view of the needs of the users, and to look out for any interesting features that can be included in the Information Portal for Women's Organization. Apart from that, the author also sought out the opinion and advice from the higher management of TNB, namely the General Manager of TNB Generation Prai Power Station, En. Sufian and also the engineer in charge of this project; Mr. Lee Song Chow.

After the developer has determined the needs and requirements of the system, the developer will start on the design of the system. Here, the developer will create the user interface, and all the other modules that are to be included in the portal. Then, this is presented to the users as a prototype. The users will then be able to give their feedback and suggestions on the prototype that has been developed. Further modification and enhancement will be carried out according to the feedback received. This process of creating prototypes will be repeated several times until the users are satisfied with the proposed prototype.

After the system design has been finalized, the developer will start on the program design and coding of the system. This process will take quite a long time due to the level of complexity and difficulty of writing the programs. Unit testing and integration will be carried

out after the program design and coding is done, to check for bugs and errors in the system.

Next, comes the system testing. This stage is very crucial to reinforce the findings and results of the requirement analysis and system design. At this stage, users will be able to see whether the system truly meets their needs and requirements or otherwise. The last part in the development of this project is the operation and maintenance stage. This is an ongoing process that will ensure the system is running smoothly without any interruptions or problems.

1.6 PROJECT SCHEDULE

As with any other project or assignment, a project schedule has to be mapped out for this project to serve as a guideline and reminder to the developer regarding the amount of time used to complete a specific part of the system and to assist the developer in managing his time wisely in the process of system development.

There are various methods that can be used to illustrate the time line or schedule for any proposed project. Developers may choose to chart their progress in terms of days, weeks, months, or some other pre-determined duration of time. The way that the information is presented also varies, according to the preferences of the developer. As long as the schedule is clear and the progress can easily be tracked using the chosen method, then the method is considered acceptable. The normal way to present the project schedule is by using a Gantt chart.

The proposed schedule for this project is shown in the Gantt chart below:

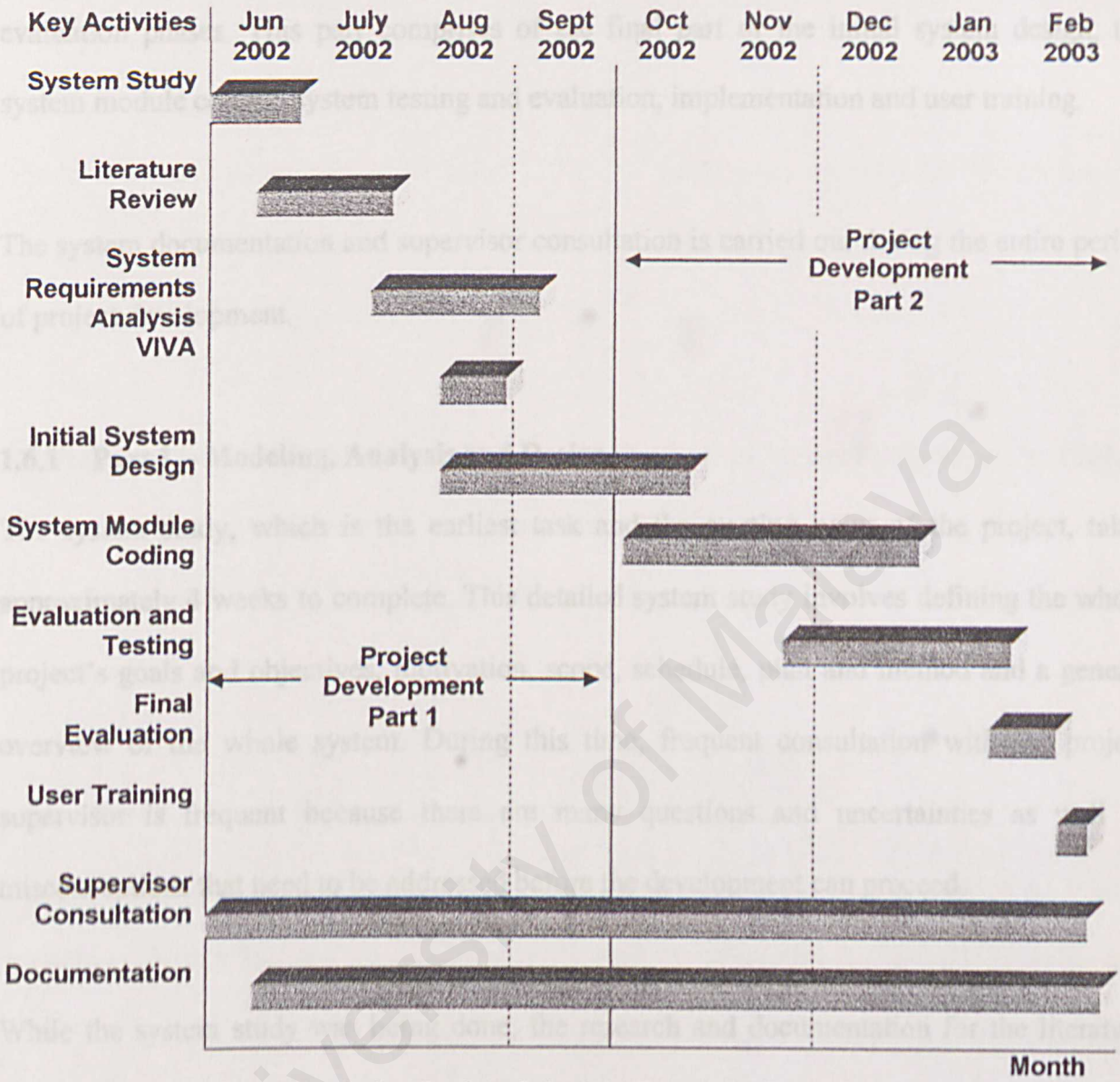


Figure 1.2: Gantt Chart Depicting Project Schedule Based On Each Core Activity

The project development is divided into two main parts. The first part of the project development involves the modeling, analysis and design phases. The study of the proposed system, literature review, user requirements study, initial system analysis and design and a VIVA session are covered in detail here.

The second part of the project mainly focuses on the development, implementation, and evaluation phases. This part comprises of the final part of the initial system design, the system module coding, system testing and evaluation, implementation and user training.

The system documentation and supervisor consultation is carried out during the entire period of project development.

1.6.1 Part 1 – Modeling, Analysis and Design

The system study, which is the earliest task and the starting point of the project, takes approximately 4 weeks to complete. This detailed system study involves defining the whole project's goals and objectives, motivation, scope, schedule, plan and method and a general overview of the whole system. During this time, frequent consultation with the project supervisor is frequent because there are many questions and uncertainties as well as misconceptions that need to be addressed before the development can proceed.

While the system study was being done, the research and documentation for the literature review was also progressing at the same time. This took about 6 weeks, as there was extensive research work that needed to be done before any documentation can be recorded. Among the resources used to gather information was the Internet, journals, books, and etc.

The system requirements analysis is expected to take around 6 to 7 weeks to complete. The system development tools analysis is performed to specify the hardware and software requirements of this project. Meetings and interviews with the clients are also carried out

during this period of time to find out their needs and requirements of the system to assist in the development of the system.

The VIVA session is scheduled from the 12th to 30th of August; whereby the development of the project will be presented to the moderator who will give propositions, ideas and comments to further improve on the system.

The initial system design is estimated to take about a total of 10 weeks. Each project module will be designed in accordance to the user requirements using the E-R (Entity-Relationship) diagram and DFD (Data Flow Diagram). The interface of the system will also be designed at the same time.

1.6.2 Part 2 – Development, Implementation and Evaluation

This part of the development will take approximately 5 months to complete. The system modules coding is expected to take around 12 weeks because this task is very complex and requires a lot of time. The quality of the coding has to be good, and during this time also, debugging and thorough testing of the modules are being carried out. This is to ensure the system is reliable and robust. A complete evaluation and testing exercise of the whole system is then done and this is estimated to take up to 8 weeks. At this point, the critical system integration will take place and stringent testing will be done from time to time.

The final implementation of the system should take around 3 weeks to complete and another week is allocated for user training. This is to help the users familiarize themselves with the

system, to answer their queries, and to solve any problems that they face when using the system

Weekly consultation with the project supervisor, Assoc. Prof. Dr. Zainab Awang Ngah is done throughout the development of the system. The project documentation is another task that is being done for almost the whole duration of the project. This is essential to provide easy reference for other similar systems and can be used as a guide for new developers to enhance or modify the system in the future.

1.7 REPORT OVERVIEW

1.7.1 Part 1 – Modeling, Analysis and Design

(a) Chapter 1 – Introduction

This opening chapter introduces an overview of the project's proposal. This includes the project overview, project motivation, the goals and objectives of the project, the project scope, plan and methods, and the project schedule. As a whole, this chapter is the initial system study that covers the project fundamentals and determines the feasibility of this project.

(b) Chapter 2 – Literature Review

This chapter includes the literature review of other works on associated issues and fields of interest. The main topics consist of the study on the different types of portals and various women's organizations relevant to this project, the critical analysis and features

study of similar existing systems, and the evaluation criteria and tools to evaluate a Web site or information portal.

(c) Chapter 3 – Methodology

This chapter identifies and provides the clarifications on the methodology, mechanism and approach that are to be adapted in this project. This is crucial to ensure that these development approaches are justified and to enlighten the reader of its significance.

(d) Chapter 4 – System Analysis

A detailed analysis of the system development tools is covered in this chapter, and this includes the practicality, effectiveness and appropriateness of the chosen tools in this project. The functional and non-functional requirements are also explored here.

(e) Chapter 5- System Design

The various modules and components of the proposed system are analyzed and justified in this chapter. It covers the analysis and design fundamentals that include the data flow approach, architectural and database design, functional design and also the user interface.

1.7.2 Part 2 – Development, Implementation and Evaluation

(a) Chapter 6 – System Implementation

This chapter describes the system software development as specified in the designed blueprints. It is first developed in a developmental operated environment and later

implemented in the actual environment using real-time data. This will eventually prepare the system for the initial system evaluation and debugging.

(b) Chapter 7 – System Testing And Evaluation

The methodical approaches for debugging and testing of the system are explained in this chapter. The system test results are also outlined according to modules. In addition, the summary of the system evaluation that comprises evaluation from the end-users are also included.

(c) Chapter 8 – Conclusion And Future Enhancement

The final chapter will conclude this report by outlining the problems faced, the approaches for solution, system strength and the limitation of the final product as well as highlight some of the anticipated outcomes. A proposal for future work to enhance the system is also clarified in this chapter.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The main purpose of literature review is to expose students to the research and analysis skills needed to prepare an academic report or thesis. By experiencing the search process and all the challenges and rewards that come with it, students are able to grasp more clearly what it means to be a developer and author of a system or software.

The literature review also serves as the platform for students to study similar systems and the existing software or services available in the market and to use this in their analysis of the proposed system. The features, interfaces, content, navigation and other areas of these systems or sites are carefully studied, analyzed, compared, and synthesized. This will come in very useful when the development and design work on the system starts because the students will already have an idea of what kind of system they want to develop and what features and modules is to be incorporated into the system.

Students are trained to be analytical and critical in their thinking, especially when analyzing the different systems and services already available. They are also motivated to be more proactive and resourceful in their quest to obtain relevant and useful information to facilitate their study.

After completing this literature review, students should have the conclusions and findings that would enable them to proceed on to analyze and design their own system.

2.2 OVERVIEW OF INFORMATION PORTAL FOR WOMEN'S ORGANIZATION

In this section, general discussion on the various types of portals available is covered, with emphasis on the definition, and study of information portals. An analysis on women's organizations are also included here and the author attempts to look at the role of the women's organizations in the context of this project.

2.2.1 Portals

In this section of the literature review, the author will touch on the introduction to portals, the benefits of using portals, the major categories of portal software, a general set of features that most portal companies include in their products, and finally the measures of a good portal.

(a) Introduction to portals

Portals started as applications, typically Web-based, providing a single point of access to distributed on-line information, such as documents resulting from a search, news channels, and links to specialized Web sites. To facilitate access to large accumulations of information, portals quickly evolved to include advanced search capabilities and organizing schemes, such as taxonomies. Because of their emphasis on information, these first-generation portals are often called information portals (Mack *et al,* 2001).

An Internet portal is defined as a gateway to information, which either can be found at a single Web site but a few layers down or located at other Web sites (Windows to the

Virtual Universe, 2001). There are dozens of portals on the public Internet. A web portal is a gateway to the Internet, which provides the end user with a more compelling experience than merely jumping on and surfing at random (Roberts, 1999). There are two types of Internet portals – the general portals and the dedicated portals. The general portals are common interest portals that cover a wide range of topics, issues and features. Information portals provide a valuable service on the Internet, by selecting, organizing, describing, and sometimes evaluating, useful sites.

Yahoo! was one of the first and is still one of the most popular public-domain, Web-based portals. The recent proliferation of portals may seem to undermine the original intent of single access, but in fact, this circumstance emphasizes that portals are defined with respect to a community of users who share common tasks and interests. (Consider, for example, the viewpoint of a shopping consumer versus that of a professional engaged in researching a topic for a report.) This is especially true for internal corporate portals, where different functional and organizational groups and lines of business may have substantially different needs for information access and organization. Examples include sales and marketing, best practices, competitive intelligence, research and development, and general corporate resources.

Specialized or dedicated portals in the corporate sector are sometimes called vortals, for vertical portals, since they provide in-depth capabilities that are highly focused on a vertical segment of an organization or field and due to their narrow coverage-area and are-subject specific in nature. Dedicated portals serve as an excellent way for users to

find out information regarding a specific subject or topic that the portal specializes in. The proposed PELITAWANIS TNB portal is a dedicated portal focused on information about the organization, its activities and members.

Portals try to target particular types of users and address their specific needs. A few examples of the different kinds of portals are included below:

All commerce. Many portals are aiming to consolidate e-commerce business in a specific sector. Amazon.com is an example of this type; it enables the user to access books and music from thousands of publishers, all at one site.

Embedded technology. Some groups are using the portal to embed and sell their technology. For example, you can keep your personal calendar on a portal site without buying any software.

Learning only. Online learning is a growing Web sector, and several portals now offer short- and long-term courses from universities, associations and training companies. Learning-portal companies often can handle registration functions for conferences and classes.

Community and collaboration. Other portals are emerging that focus on building a digital community of users. You can recognize these portals by the presence of standard community technologies: chat rooms, threaded discussions, access to coaching and links to books to buy. The largest example of this is an online community for women, www.ivillage.com, which had 4 million unique visitors in June (iVillage, 2002).

Affiliation portals. These portals, geared to the nonprofit association world, offer the usual services -- learning opportunities, chat rooms and shopping -- using the association's equivalent of the Good Housekeeping seal of approval to recommend items. The affiliation allows for content screening and/or discount buying.

(b) Benefits of using portals

Portals can provide invaluable information resources to its users if the portal is implemented for the right reasons and the need of the audience is understood. Portals make it easier to gather information from one or more servers as well as from the Internet and deliver that information through a single consistent interface across the enterprise (Developing an Information Portal, 2002). Users can gather information from a variety of sources such as documents, databases, e-mails, and Web sites. The type of information includes text, graphics, audio and video information.

Portals also enable users to access relevant information in an efficient and quick manner. This saves the users' time and makes the search for information much easier. This in turn will help to increase the user's productivity. Apart from that, portals also enable more efficient communication between the users, administrators and managers of the portal.

(c) The four major categories of portal software (Edelman & Jussila, 2000)

Virtually every software vendor has introduced something it calls a portal. There are four major categories of portal software:

- Digital dashboard portals

Digital dashboard portal vendors offer technology that allows for some basic centralization of common applications. The value-added component here is a common interface that can display disparate applications or link them together. With additional development, these types of portals can be manipulated to provide enhanced functionality.

- Pure-play portals

Pure-play portals vendors are focused specifically on their portal offering and are concerned about providing functionality that goes well beyond the digital dashboard. Specifically, most portal vendors are looking to provide an aggregation point for a number of applications. This includes normal business productivity tools, such as e-mail, in-house enterprise resource planning applications, line-of-business applications, public access Web sites, collaboration tools, and any other application tool that may make sense. Ideally, there's some type of personalization and administrative control that lets the portal be modified with considerable ease.

- Application portals

Virtually every application vendor has amended its application to have a portal interface. Often, vendors include some type of Web interface to their systems with the ability to provide links to other Web resources. Of course, with additional development functionality can be enhanced.

- Infrastructure portals

Vendors such as IBM, Lotus, Microsoft, and Oracle have introduced their versions of the portal, as well. Microsoft has the Digital Dashboard and Tahoe, and Lotus has Raven. In both cases, these companies provide some underlying portal building blocks. These are often based on many of the same technologies as the pure plays. However, the key distinguishing feature here is in-depth functionality and focus. Whereas the pure plays concentrate all of their efforts on providing a heterogeneous environment that can work across multiple applications, directory services, etc., the infrastructure portals concentrate their technologies on products developed by their respective companies.

(d) General features that most companies include in their products

- Business intelligence.

This allows reports to be generated from business databases. Tools often provide in-depth number crunching and support the extensive analysis of data. Reports can be manually executed or triggered through a variety of events.

- Transaction integration and processing.

Most portals have underlying component applications that serve as the driving force for the vendor. These normally will provide access to structured databases as well as unstructured information in the form of documents. Certain vendors recognize that the portal consists not only of access, but the ability to have the component applications communicate and perform integrated processes. Consequently, processing transactions between applications can provide strategic value.

- Taxonomy creation.

Many portals offer a knowledge-management component that lets information be automatically or manually categorized into clusters. This allows for an alternative searching metaphor.

- Collaboration. This is open to interpretation. In the context of the portal, it could include any or all of the following capabilities:
  - Workflow and routing of documents;
  - Discussion threads;
  - User-chat sessions;
  - Dynamic group and team creation; and
  - Interactive collaboration, including video, voice, and application sharing.
- Cross-repository searching.

Because many portals originated from knowledge-management systems, the ability to perform cross-repository searches has become a common feature. Users can go to one place and perform searches across disparate repositories such as a Lotus Notes database, Microsoft Exchange public folders, Web sites, file systems, databases, and a collection of other repositories.

- Document management.

Some portal vendors incorporate some level of document management in their systems. This provides a way to manage documents and Web content throughout the project life cycle. It can include versioning, security, metadata searching, and a host of other features.

- Integration and compliance with global directory services.

Portals are designed to be used by one or many companies and as such are often tied into global directory services such as Lightweight Directory Access Protocol, Novell Directory Services, or Windows NT Domain Services. This eliminates or minimizes the duplication of data for user and group information.

- Links to Web sites.

Similar to personal portals, many business portals provide users with the ability to include links to other Web sites. This may be a direct link, a reduced function window that provides some view into a Web site, or a combination of both.

- Personalization.

In the context of portals, personalization normally refers to the personal selection and placement of content or features available to the user. Personalization also refers to personalized color or theme preferences.

- Single sign-on.

This feature is offered by a few portal vendors. It is normally performed by having a centralized database function within the portal. The database will contain the proper authentication credentials for each component application.

- Subscriptions.

A few portal vendors are bundling subscription functionality into their products. This lets users subscribe to applications in the portal. When additions and deletions are performed for a particular database record, for example, users may elect to be notified via e-mail.

- Syndication.

This refers to the syndicated data available, normally freely, by content providers. Syndicated data can be virtually any information source and is similar to a news feed that delivers information to your portal.

(e) Measures of a Good Portal

If one decided to surf the Internet for information, how would one know which Web sites and portals to visit? And after going to the Web site, how do we determine whether the information that is posted on the site accurate and authoritative? These are among the many questions that users of the Internet and World Wide Web have, and the author will attempt to provide some guidelines or criteria of a good Web site or portal to answer these questions.

There are a few standards and measures suggested by various experts in the field of Web site evaluation. Authority, reliability, and the overall quality of the sites are among the more prominent features that are considered crucial to a Web site's performance and acceptance.

A checklist for evaluating Web resources (2000), states:

Authority:

- Is the information reliable?
- Check the author's credentials and affiliation. Is the author an expert in the field?
- Does the resource have a reputable organization or expert behind it?
- Are the sources of information stated? Can you verify the information?

- Can the author be contacted for clarification?
- Check for organizational or author biases.

Scope:

- Is the material at this site useful, unique, accurate or is it derivative, repetitious, or doubtful?
- Is the information available in other formats?
- Is the purpose of the resource clearly stated? Does it fulfill its purpose?
- What items are included in the resource? What subject area, time period, formats or types of material are covered?
- Is the information factual or opinion?
- Does the site contain original information or simply links?
- How frequently is the resource updated?
- Does the site have clear and obvious pointers to new content?

Format and Presentation:

- Is the information easy to get to? How many links does it take to get to something useful?
- What is the quality of the graphical images? Do these images enhance the resource or distract from the content?
- Is the target audience or intended users clearly indicated?
- Is the arrangement of links uncluttered?
- Does the site have its own search engine?

- Is the site easily browsed able or searchable?

Cost and Accessibility:

- Is the site available on a consistent basis?
- Is response time fast?
- Does the site have a text-based alternative?
- How many links lead to a dead-end?
- Is this a fee-based site? Can non-members still have access to part of the site?
- Must you register a name and password before using the site?

Other Tips:

- Check the header and footer information to determine the author and source.
- In the URL, a tilde ~ usually indicated a personal web directory rather than being part of the organization's official web site.
- In order to verify an author's credentials, you may need to consult some printed sources such as *Who's Who in America* or the *Biography Index*.
- Check and compare the web site to others, which are both similar and different.

2.2.2 Women's organizations

Women's organizations all have different motivations and objectives in setting up their organization, but on the most part, the main purpose is to help empower women in various areas and fields and also to highlight issues that concern women besides serving as a channel for women to speak out and let their voice be heard. Some of the

organizations are initially set up to provide support for women in a particular company or corporate organization, for instance the PELITAWANIS TNB or for women of similar interests and needs at heart, such as the Sisters in Islam.

In Malaysia, there are numerous women's organizations established to serve different purposes for the benefit of their members. These organizations are non-profit and voluntary organizations, and they exist independently although most of the organizations do maintain some form of contact and collaboration with other women's organizations.

There are various ways that are used by the organizations to connect to one another, such as by affiliating themselves to another organization, working together on projects and seminars, and also through information sharing. The author will be focusing on the National Council of Women's Organizations (NCWO) of Malaysia and its role as the advisory body for women's organizations in Malaysia, as the PELITAWANIS TNB movement is also affiliated to the NCWO. This would help to provide an overview of the women's organizations in Malaysia.

National Council of Women's Organizations (NCWO) of Malaysia

The National Council of Women's Organizations (NCWO) of Malaysia is the consultative and advisory body for women's organizations affiliated to it. The formation of the NCWO was a major step in the history of our country. Unity, Understanding, Co-operation, Sacrifice, Conviction and Determination formed the corner stone of the Council. The sustained and dynamic leadership that NCWO has given to women's

organizations has enabled them to pursue programs in an even numerous tasks both at home as wives and mothers and in their work; in education, in upgrading the quality of schooling; the elimination of legislation that discriminate against women; in the economy and employment sectors as valuable contributors to national economic development and in politics where active involvement of women has been encouraged and the area of violence against women.

NCWO has been a catalyst for change in all areas of national activity. From equal pay to the position of women in marriage separation, divorce, to legal question of maintenance, custody of children, division of property in cases of divorce, to the appointment of women to assist in Departments of Islamic Affairs in the States, the NCWO has been the most effective, determined and vocal advocate for women in our nation.

The Council has taken a leadership position for those of our people in lower income groups and even more critical, to those below the poverty line. Our pleas for more well coordinated programs for low cost housing for those living in squatter areas and other slum have been both repetitive and constant in our annual budget dialogue sessions with the Minister of Finance.

NCWO in the 1960s successfully campaigned for the Civil & Diplomatic Services to be opened to equally qualified, competent women as well as amendment to the Pensions Act, which gave women permanent and pension able status in civil service. In 1969, equal pay for work of equal value was also implemented. In that year too, the NCWO President, Tan Sri Fatimah Hashim was appointed as the first women minister in the

Malaysian Cabinet while Datuk Paduka Aishah Ghani was selected to sit on the UN Commissions on the Status of Women.

From 1966, the NCWO had urged the Government to establish a special Women's Bureau. The National Advisory Council for the Integration of Women in Development (NACIWI) was officially established on the 20th of June 1976, the Advisory Council working with the Women's Section of the Prime Minister's Department (HAWA), NACIWID, the government agency, and NCWO, women in Malaysia were able to pursue both short term and long term programs in order to achieve their goals. In the 1970s the NCWO celebrated the International Year for Women by calling for representation of Women's Organizations in he ASEAN Region.

This led to the formation of the Asean Sub-Committee on Women and the ASEAN Confederation of Women's Organizations (ACWO). Malaysian women also achieved separate taxation and a Royal Commission was set up to study the Marriage and Divorce Act 1976 for Non-Muslims. The Act came into force in 1981. A memorandum and a Children's Charter were presented to the Prime Minister and relevant Ministries, which eventually led to the Children's Protection Act in 1990.

In the 1980s, NCWO stepped up its advocacy work on legislations and in 1985 held a national workshop that resulted in a memorandum containing 7 resolutions and recommendations on major legislation that discriminated against women, which was presented to the Government. With assistance from Sgt. Robert Holmes from the Royal Canadian Mounted Police, a Malaysian Rape Investigation Kit was produced, A One Stop Rape Crisis Center was established in General Hospital Kuala Lumpur, A Training

of Trainers Program was organized for A special Investigation Unit of Women Police Officers. Another major accomplishment was NCWO's memorandum on the National Policy on Women, which was submitted to NACIWID and the Minister in charge of Women's Affairs.

This resulted in the Malaysian Cabinet accepting the National Policy on Women in December 1989. In the 1990s, NCWO set-up various Commissions based on the sectors contained in the National Policy on Women. Each Commission drew up an action plan and these were incorporated in the NCWO NGO Plan of Action for the Implementation of the National Policy on Women.

In 1986, the NCWO sent a memorandum to the Human Resources Ministry regarding the extension of maternity leave for working women, in line with the International Labor Organization's requirements (90 days). Under the Employment Act 1955, maternity leave is allowed for 60 days in the private sector and 42 days in the government sector. (Council wants 90-day leave, 1993). The reason for the extension is to enable women to have more time to recover from delivery and breastfeed their newborn babies (Gains for workers?, 1993).

AIDS Counseling Centers were also set up by the NCWO. The center offers free counseling, phone-in services, and information on AIDS, HIV and safe sex in an effort to curb HIV infection among Malaysians. The center hopes to play the role of an advocacy body advising the Government on policies concerning HIV and AIDS (NCWO to set up center to help check AIDS, 1993).

Factory operators were also urged to work together with the NCWO to set up service centers for their female employees to prevent them from getting involved in vice activities (Zaleha: Set up centers to counsel factory girls, 1993). The factories were to provide the financial assistance while NCWO provides the expertise to set up the centers. The council gave special emphasis to factory workers because they were considered a high-risk group. This was because most of the girls were young and vulnerable as they were mostly from villages. By setting up such centers, problems such as exploitation and illegal pregnancies could be reduced. The main idea of such centers would be to provide professional assistance to women.

The Malaysian Government acceded to the Convention in the Elimination of all forms of Discrimination Against Women (CEDAW) in 1995 with some reservations. These reservations, except for two have now been removed. In 1996, as a follow-up of the UN 4th World Conference on Women, NCWO held a post Beijing National Conference to identify areas from the Beijing Platform of Action pertinent to Malaysia, which were incorporated into the National Policy on Women and Action Plan.

Women's groups had waited for a long time for the Domestic Violence Act to be passed (Get bill tabled, women's groups urge Government, 1993). The Domestic Violence Act was passed in 1994 but came into effect in 1996 and the NCWO organized a Road Show to raise awareness of this Act at State and District Level. The Ministry of Health has set up One Stop Crisis Centers in 90% of Government Hospitals, as a result of NCWO advocacy. An important national conference was held in 1997 in collaboration with the Sisters in Islam on the Syariah Family Laws, which affected Muslim women. A

comprehensive memorandum calling for standardization in the implementation of the Syariah Family Laws at State Level and other issues were presented to the Prime Minister and other relevant authorities. The portal for Sisters In Islam (SIS) is discussed in *Chapter 2.4 Study of Existing Portals of Women's Organizations.*

The NCWO set up a Women's Watch in 1998 to protect and further enhance the rights of women and to closely liaise and interact with relevant government agencies to assess the present position of women and to urge for major reforms and changes. In 1998 the Distribution Act was passed. NCWO together with MKKM (Child Welfare Council) and UNICEF launched a campaign to make urban areas child friendly.

In 1999 NCWO organized a workshop and presented its recommendations on National Economic Consultative Council II to the Government. Women's Day celebrations were organized in a very elaborate program under the Chairmanship of YB Dato Sharizat Abdul Jalil. The NCWO Science & Technology Commission has launched an ICT project "Networking - Women". The Newwomen.net Portal that was developed under the Networking Women Project is discussed in *Chapter 2.4 Study of the Existing Portals of Women's Organizations.*

In 2000 during the Global Knowledge 11 Conference NCWO with co sponsorship from UNDP Malaysia and UNDP Asia Pacific Gender Equity Network organized the GK II Women's Forum. To ensure the participation of young women in GK II Youth Forum, with assistance from UNICEF we brought young women from Cambodia, Thailand, Vietnam, Brunei D.S., Myanmar, Vietnam and Malaysia.

NCWO is working on the Family Court Act, with the Department of Law in the Prime Minister's office, A Mentorship and Leadership Program with YWCA to increase participation of young women in NGOs and Political parties. We are also working with the Ministry of Housing & Local Government on environmental issues; Ministry of Human Resources on Foreign Maids, Ministry of Health on the Women's Hospital and other health issues. The NCWO continues to organize programs for women's development and more effective participation in all areas of national life, as this is both essential for the nation and for each individual woman.

The recognition of the self-worth of a women, making the woman aware of her rights, responsibilities and duties and thus reinforcing her self-esteem is as important as the task of initiating legal reform. Efforts to advance the status and role of women in Malaysia demands a balanced, equal, harmonious partnership and relationship between men and women with innate and real mutual respect and in the common interest of the country and people.

Recognition that basic human rights are essential and can only be fully realized when poverty, wherever it exists, is totally eliminated and when all men, women and children can live with self-respect and dignity. The NCWO made up of ninety-one women's affiliates, with undaunted courage and unflagging spirit gives its leadership and strength and continues to work for unity of nation, democracy, equality, prosperity, progress and peace.

The list of organizations affiliated to NCWO is as follows:

1. Young Women's Christian Association (YWCA)
2. National Association of Women Peninsular Malaysia (WI)
3. Malaysian Indian Congress Ladies Section (MIC)
4. Selangor Chinese Women Li Chee
5. University Women's Association (UWA)
6. Muslim Women's Action Society (PERTIWI)
7. Girl Guides Association Malaysia
8. Malaysian Trade Union Congress (MTUC)
9. Secretaries Society Malaysia (SSM)
10. Persatuan Wartawan Wanita Malaysia (PERTAMA)
11. Kuala Lumpur Speaker's Club
12. Women International Club (WIC)
13. Malaysian Ceylonese Congress National Women's Council (MCC)
14. The Malaysia Ministry of Foreign Affairs Ladies Association (PERWAKILAN)
15. Methodist Women (Formerly known as Women Society of Christian Services)
16. Malaysia Association of Youth Clubs (MAYC)
17. Women Association of Kuala Lumpur National Electricity Board (PELITAWANIS)
18. Gerakan Belia 4B (Wanita) Malaysia
19. National Union of Co-operatives Malaysia, Women's Section (ANGKASA)
20. Buddhist Missionary Society (Ladies Section)
21. Congress of Union Employees in the Public and Civil Services (CUEPACS)
22. Malaysian Armed Forces Civilian Staff Union (KESATRIA)

23. Women Graduate Society, Malaysia (PSWM)

24. Malaysian Hindu Sangam

25. Medical Faculty Women's Club (KWFP)

26. Association of Welfare and Sport for Reservists Malaysia (KESULA)

27. Women's Aid Organization (AWO)

28. Bahai' Women's Committee

29. Malaysia Hindu Youth Council

30. Women's Section, Parti Gerakan Rakyat Malaysia (PGRM)

31. Women's Group, Malayan Railway Authority (KTM)

32. Women's Association, National University of Malaysia (SUKMANITA)

33. Association of Bumiputra Women Entrepreneurs Malaysia (PUBM)

34. Association of Women Lawyers (AWL)

35. Women's Association of Sabah (PEWASA)

36. Women's Section of the Association for the Advancement of Indians in Malaysia (AIM)

37. Good Shepherd Sisters

38. Sarawak Women for Women Society (SWWS)

39. National Council of Petroleum and Chemical Industry workers (NUPICW)

40. Women's Sections Selangor Chinese Assembly Hall

41. Crisis Center for Women, Penang

42. Council for the Welfare of Women and Girls, Penang

43. Inner Wheel Kuala Lumpur

44. Women's Sections, Federal Land Development Authority (FELDA)

45. Federation of Family Planning Associations Malaysia (FFPAM)
46. The Association of Bumiputra Business and Professional Women in Selangor and Federal Territory (PERNIAGAWATI)
47. National Union of the Teaching Profession (NUTP)
48. Persatuan Atletik dan Kebajikan Ahli-ahli Telekom, Petaling Jaya.
49. Soroptimist International Club of Kuala Lumpur
50. Women for Women Association Malaysia
51. Association of Nurse Tutors, Peninsular Malaysia
52. Sarawak Teachers' Union
53. Women Section, DAP Malaysia
54. Women Section, Malaysia Sikh Youth Association
55. State Chinese (Penang) Association
56. Education, Welfare & Research Foundation Malaysia (EWRF)
57. Persatuan Wanita Badminton Pulau Mutiara, Penang
58. Women's Association, Institute Technology MARA (PEWANI)
59. NCWO Penang Branch
60. NCWO Pahang Branch
61. NCWO Negeri Sembilan Branch
62. Malaysian Chinese Association (MCA) Ladies Sections
63. Wanita Perkim, Bahagian Pulau Pinang
64. Persatuan Bekas Pelajar-Pelajar Sekolah Lebuh Light Pulau Pinang.
65. Srikandi PBTM Persatuan Bekas Tentera Malaysia
66. Persatuan Jemaah Islam Malaysia (JIM)

67. East Meets West Club

68. Dewan Perhimpunan China Pulau Pinang

69. Persatuan Penjagaan Buah Dada Pulau Pinang

70. Leong See Kah Miew (Ladies Section)

71. The Jaffenese Co-operative Society Ltd

72. National Association of Women Entrepreneurs of Malaysia (NAWEM)

73. Sarawak United People's Party (SUPP)

74. Persatuan Jururawat Malaysia

75. Persatuan Wanita Rantau Asia dan Pasifik Malaysia (PPSEAWA)

76. Persatuan Kebajikan Islam Mlaysia (PERKIM)

77. Biro Hal Ehwal Wanita Angkasa Belia Islam Malysia (ABIM)

78. The Catholic Women's League of Malaysia

79. Southeast Asian Association for Gender Studies (SAMA)

80. The Council of Churches of Malaysia

81. Persatuan Guru-Guru Lepasan Maktab Persuruan Perempuan Melayu Melaka (MWTC)

82. Persatuan Usahawan Wawasan Wanita Malaysia (WAWASANITA)

83. Bahai Office for the Advancement of Women's Sarawak (BOAW)

84. Pertubuhan Rumah Perlindungan Wanita/Kanak-Kanak (Didera)

85. Sabah Nurses Association (SANA)

86. Kelab Amal Wanita Sri Sruti (KAWAN)

87. Yayasan Sukan dan Kecergasan Wanita Malaysia (WSFFM)

88. Sarawak National Party Women's Wing (SNAP)

89. Pergerakan Wanita PPP Malaysia (PPP Malaysia)

90. Majlis Kebajikan Wanita, Pulau Pinang

91. Women's Sports and Fitness Foundation Malaysia (WSFFM)

Source: About Us - National Council of Women's Organizations (NCWO) Malaysia. (2001). Available at: http://www.ncwo.org.my/

Another women's organization that is highlighted here is the Women's Institute (WI) or also known as National Association of Women Peninsular Malaysia. This organization deserves mentioning, as it is the oldest women's organization in Malaysia.

Women's Institute

The Women's Institute (WI), the country's oldest non-political women's organization was established in 1953 and continues to be active till today, especially in the rural areas. Based on the ideals of fellowship, service and mutual help, the WI was formed by Lady Templer, wife of then British High Commissioner Sir Gerald Templer (Changing focus of WI activities, 1993).

The objective then was to unite women in the rural areas to better their standards of living in the areas of health, nutrition, agricultural, child-care, community welfare, and domestic skills like sewing and cooking. However, in meeting changing needs, the movement has diversified its activities to include organizing seminars and talks on current issues like

AIDS and dadah abuse and courses on basic business skills, fabric printing, and the catering business.

Though it began as a rural women's movement, WI has spread to the small towns and urban centers. It now has about 50,000 members. Leadership training is an important objective of WI. This is to enable potential leaders to play a more effective role in community life and development.

The WI became a member of the Associated Country Women of the World (ACWW) in 1956. The ACWW is affiliated to 285 societies in 80 member countries with a membership of about nine million women. The ACWW council members meet annually in London while the delegates' conference is held every three years.

2.3 RESEARCH ON PELITAWANIS TNB

This part of the literature review will present information regarding PELITAWANIS TNB, such as its history, activities, services, members and much more.

Pelitawanis LLN was established on 15th February 1976 and was registered on 1st June 1978. Since 15th August 1998, it is known as PELITAWANIS TNB according to the new Constitution (Perlembagaan). The founder of this organization is Y. Bhg. Puan Sri Datin Zaidah Bt Dato' Abu Bakar.

The first activity that garnered a lot of support and attention was the establishment of a kindergarten (Tadika), especially for the staff's children and the lower income group. This is followed by the establishment of a library.

As of 30th July 1978, branches of PELITAWANIS TNB has been established in Kota Bharu, Alor Setar, Kuantan, Johor Bahru, Perai Power Station, Pulau Pinang, Kluang, Muar, Ipoh and Sultan Ismail Power Station (Johor Bahru).

The main purpose of the inception of PELITAWANIS TNB is to foster closer ties between the women work force and wives of the employees from all levels in TNB. It is not limited to the Headquarters in Kuala Lumpur only; the establishment of PELITAWANIS TNB in the offices all over the Peninsular is very much encouraged and supported.

In one of the speeches given by Y. Bhg. Tan Sri Dato Abu Zarim bin Haji Omar, the General Manager of LLN at that time, he made it clear that he really desired to see PELITAWANIS be like a lamp (pelita) that will light up the lives of all Malaysians, and that it's light will not die out. His dream has now been realized, with the establishment of more than 53 branches of PELITAWANIS TNB in Peninsular Malaysia and the number of members reaching 8,000 members.

Of course, PELITAWANIS TNB has come a long way since it's establishment and many improvements have been brought about during this time. Many activities have also been held and will continue to be held, both at the national level and branch level. The

information regarding the various activities undertaken will be discussed in detail further on in this section.

Source: PELITAWANIS TNB. (2002). Available at: http://www.tnb.com.my/pelitawanis

2.3.1 The Pelita-Kasih Project

(a) Background of Pelita-Kasih

During the 23rd Annual General Meeting of TNB on the 24th of March 2001, the Chairman of TNB made a proposal for PELITAWANIS TNB to draft out a community outreach program whereby the widows and orphans among the TNB workforce and family be adopted as the adopted family (keluarga angkat) of TNB.

As a caring employer, TNB has prepared a comprehensive welfare service policy for the benefit of the family members of its workforce who passed away, especially those who died while still in service. According to statistics, around 50 staff members pass away in a year while in service with TNB. Due to the tragic death of these staff, the widows and children lost the head of the family who also served as the main breadwinner. Even though the management of TNB provides assistance in the form of medical treatment, and child education aid, it cannot be denied that these families need support and help in terms of counseling, attention and guidance from mentors that they can look up to.

In accordance to this finding, PELITAWANIS TNB has been identified as the most suitable agent to implement this program because its members are made up of women

(female employees and employees' wives). Women are naturally more suited to caring for others due to their gentle, sensitive and compassionate nature as well as their motherly instinct.

(b) The Pelita-Kasih Program

The National Working Committee of PELITAWANIS TNB has agreed to accept the proposal made by the Chairman of TNB to undertake the The Outreach Jalinan Kasih Program or also known as the Pelita-Kasih under its wings.

Besides fulfilling the aspiration of TNB in becoming a caring employer, it is hoped that this program will be able to help the families of those staff who passed away, as a way of thanking them for their years of dedicated and loyal service to TNB in particular and the nation as a whole during their lifetime. Indirectly, it is hoped that this program will also bring about a positive influence on the children affected so that they can grow up to be useful citizens of the country.

(c) Scope of the Pelita-Kasih Program

The Pelita-Kasih Program needs the co-operation from all the branches of PELITAWANIS TNB to work with their respective Station/Division Leader to identify the families that are involved in their own branches; and to adopt the family as the adopted family for that branch.

The focus of this program is on giving guidance regarding the children's education, relaying financial support from TNB or other related sources, providing their daily needs, motivation and counseling services, visits to the homes of the affected families and other activities or ways that can help lighten the burden of daily living of the whole family.

(d) The Role of PELITAWANIS TNB

PELITAWANIS TNB as the implementing agent (agensi pelaksana) of TNB will take on the role of liaison, mentor and counselor between the management of TNB and the affected families. To determine the success of this program, the full commitment and co-operation from all members of PELITAWANIS TNB is greatly needed.

(e) Implementation Procedure (Tatacara Perlaksanaan)

Table 2.1: The Procedure of Setting Up a Pelita-Kasih "Mentor Group" in TNB Branches

Steps	Action
1	Setting up a group that will act as the mentor to the affected families (hereafter referred to as the "Mentor Group"). The Mentor Group must be made up of PELITAWANIS TNB members who are experienced and/or committed in the areas of welfare, community, education, social, health and family counseling.
2	The Mentor Group is formally registered and holds meetings with the Section/ Division Leader regarding the Pelita-Kasih program.
3	Registering the Mentor Group with the National PELITAWANIS TNB Welfare Biro.
4	The Mentor Group operates in the event of a death and carries out follow-up

	visits with co-operation from their respective Section/Division Leader.

(f) Modus Operandi

Table 2.2: Modus Operandi of the Pelita-Kasih Program

Steps	Action
1	The Mentor Group Leader contacts all group members and Section/Division Leader to arrange for a visit to the deceased's family.
2	The Mentor Group Leader relays details regarding the death to the Chairperson of the National PELITAWANIS TNB Welfare Biro who in turn informs the Yang Dipertua of PELITAWANIS TNB.
3	The Mentor Group introduces themselves to the widow/family of the deceased and offers to help in the burial and related matters.
4	The Mentor Group carries out follow-up visits and assists the adopted family in the areas of welfare, community, education, social, health, and family counseling; once a month.

(g) Transport

The Section/Division Leader will provide official transport for the disposal of the Mentor Group for the whole duration of the Pelita-Kasih program.

(h) Financial Implications

This program is fully sponsored by TNB. It involves making available RM300 per month to provide for the basic necessities of the family. Every branch will have to submit an application to qualify for this assistance in the event of a death.

(i) Others

The Mentor Group for the purpose of this program can use all forms that are provided by the Section/Division of TNB.

Source: The Pelita-Kasih Program. (2002). Available at:

http://www.tnb.com.my/pelitawanis/pelitakasih2002

2.4 STUDY OF EXISTING PORTALS OF WOMEN'S ORGANIZATIONS

Various Web sites and portals that are relevant and similar to the proposed system are studied and analyzed here. These Web sites include organizations that are based in Malaysia and also internationally based organizations in different countries, such as Singapore and the United States. Web sites that cater mainly for women such as those that are created especially with women's interests and needs at heart, for example the newwomen.net portal, are also included in this study.

The list of Web sites that are included is as shown below and a brief introduction to the various organizations are also provided in this section.

(a) Women's Aid Organization of Malaysia (WAO)

(b) PELITAWANIS TNB

(c) Sisters in Islam (SIS)

(d) Newwomen.net

(e) National Council of Women's Organizations (NCWO) of Malaysia

(f) National Council of Women's Organizations (NCWO)

(g) National Organization for Women (NOW)

(h) Singapore Council of Women's Organizations (SCWO)

(a) Women's Aid Organization of Malaysia (WAO)

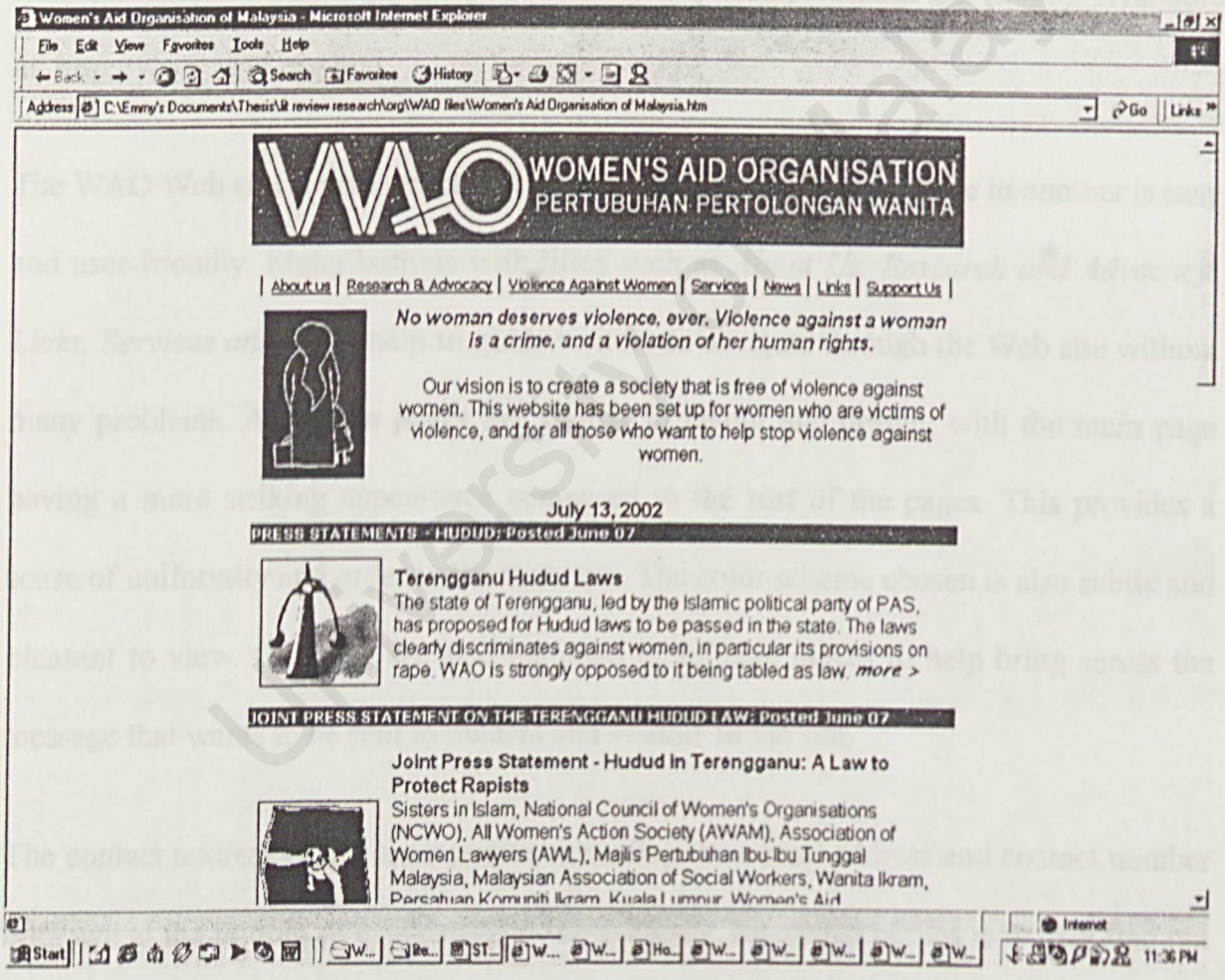


Figure 2.1: The Main Page of the Women's Aid Organization Web site

This site is the official Web site for WAO in Malaysia. The Women's Aid Organization (WAO) is an independent, non-religious, non-governmental organization based in Malaysia, committed to confronting violence against women. WAO was established in 1982 when it opened Malaysia's first Women's Refuge, providing shelter, counseling and child support to battered women. WAO is also involved in public education to create awareness of Violence Against Women and women's rights, and does advocacy on legal reform, in particular, policies and laws that discriminate against women.

Source: Women's Aid Organization of Malaysia (WAO) – About Us. (2000). Available at: http://www.wao.org.my/

The WAO Web site is well structured and the navigation from one page to another is easy and user-friendly. Menu buttons with titles such as *About Us, Research and Advocacy, Links, Services and News* help to guide visitors to navigate through the Web site without many problems. All of the pages are similar in layout and design, with the main page having a more striking appearance compared to the rest of the pages. This provides a sense of uniformity and order to the Web site. The color scheme chosen is also subtle and pleasant to view. Graphics are also included in suitable places to help bring across the message that wants to be sent to readers and visitors to the site.

The contact address of the organization including the e-mail address and contact number is shown at the bottom of every page in the Web site. Interested parties may then find out more information or get in contact with people from the organization through the Web site.

The information found from the Web site is comprehensive, updated and is presented in a format that is attractive to users. For example, the topics of discussion in each area is first shown as subheadings that if clicked will lead to the specific topic. Users also have the option to either navigate by scrolling down the pages or by clicking on the highlighted links provided.

The vast collection of news articles found in the archive of the Web site is carefully and systematically put together in a table, showing the date of release and the topic headings. Users only have to click on the links to reach the wanted article.

Links to other organizations' Web sites and other related Web sites are also provided in this Web site. The links are categorized accordingly, to make the presentation of the links more systematic. For instance, the categories found are *Malaysian Links, Women's News, and International Conventions on Women's Rights, Women's Voices and Online Community for Women,* and etc. A brief introduction of the Web site is also given to assist users in deciding which link is of relevance to their purpose.

Perhaps one of the weaknesses of this Web site is the lack of multimedia features such as photo galleries, dynamic "text" and the use of multimedia presentation to attract online viewers to understand further the WAO cause and mission.

Online registration is also not available in the Web site. Forums and bulletin boards for visitors to post their comments and to communicate with each other are also not available.

Another feature that is not incorporated in the Web site is the search function. Visitors to the site do not have the option to search for information; be it information within or outside of the WAO Web site. This is something that the developer of the Web site can look into to enhance the usability of the Web site.

Overall, this Web site served its purpose of disseminating information regarding the organization and its activities well, but it lacks features that can improve its attractiveness and usability to visitors.

(b) PELITAWANIS TNB

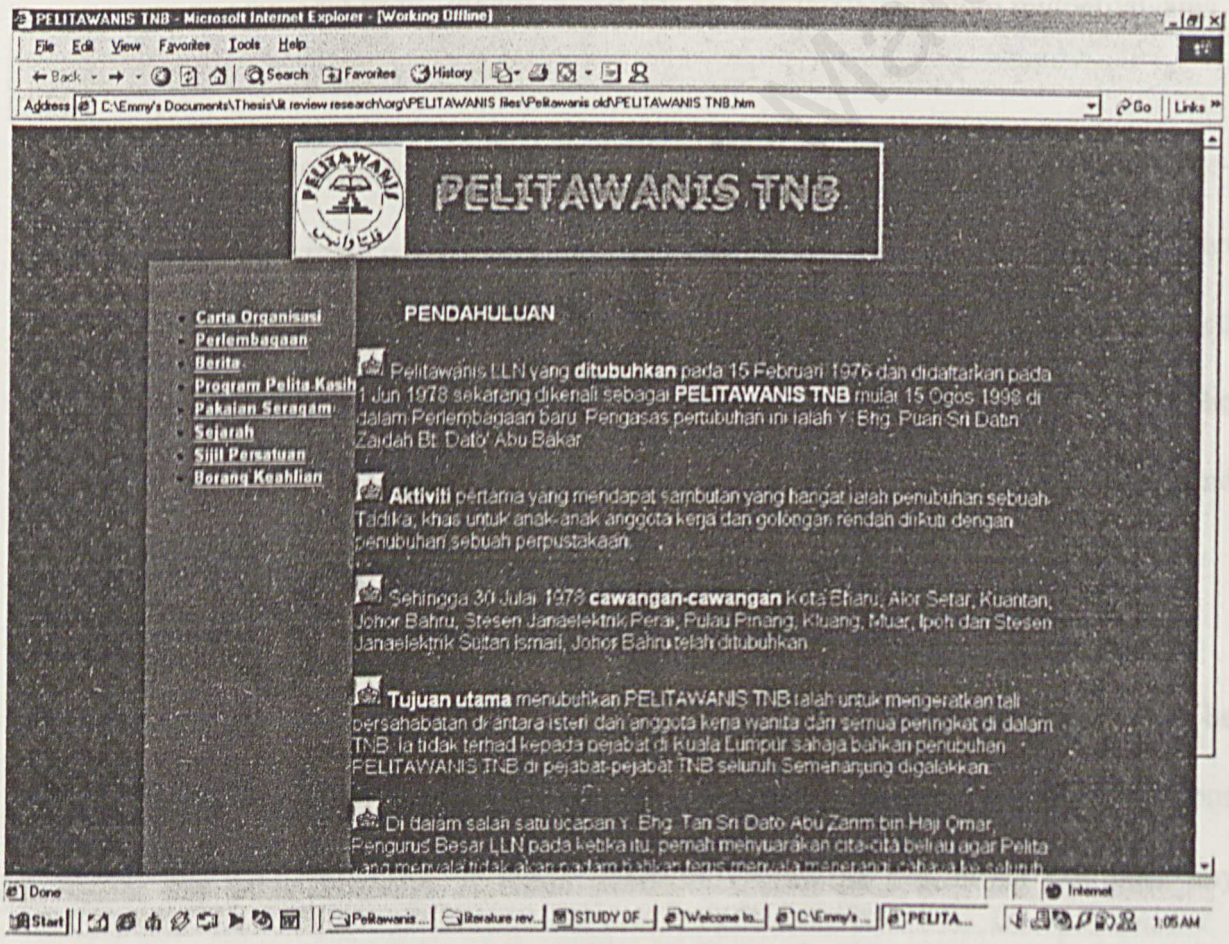


Figure 2.2: The Main Page of PELITAWANIS TNB Web site

Pelitawanis LLN was established on 15 February 1976 and was registered on 1 June 1978. Pelitawanis LLN is now known as PELITAWANIS TNB starting from 15 August 1998 in the new Constitution. The founder of this organization is Y. Bhg. Puan Sri Datin Zaidah Bt. Dato' Abu Bakar.

The main purpose of establishing the PELITAWANIS TNB is to foster closer ties between the wives of the staff and women work force from all levels in TNB. It is not limited to the Headquarters in Kuala Lumpur only, but the establishment of PELITAWANIS TNB in all branches of TNB is very much encouraged.

Source: PELITAWANIS TNB. (2002). Available at: http://www.tnb.com.my/pelitawanis

The modules and information found in this Web site is very limited and not kept up-to-date. Apart from the main page, the only information that was found was the organization chart, pictures of organization's uniform and some news articles besides a page dedicated to one of its activities. Registration forms were also put in the Web site, but only in the form of a Word Document and those who wished to register had to print out the form and fill it in before sending it to the organization for processing.

The color scheme and overall layout and design of the Web site also leave much to be desired. The whole content of the Web site is written in Bahasa Malaysia, and no options to select any other language is made available. Although this might not pose any problems to Malaysian or local visitors, this would greatly discourage people from other countries especially those who do not understand Bahasa Malaysia to visit this Web site.

As a result of that, it is difficult to introduce the organization to people globally due to the language constraint.

The Web site is not at all comprehensive and does not include many features that a Web portal should have. Therefore, a vast improvement is needed to make this Web site more useful and current.

(c) PELITAWANIS TNB (new)

Source: PELITAWANIS TNB (new). (2002). Available at: http://www.tnbubf.com.my/pelitawanis

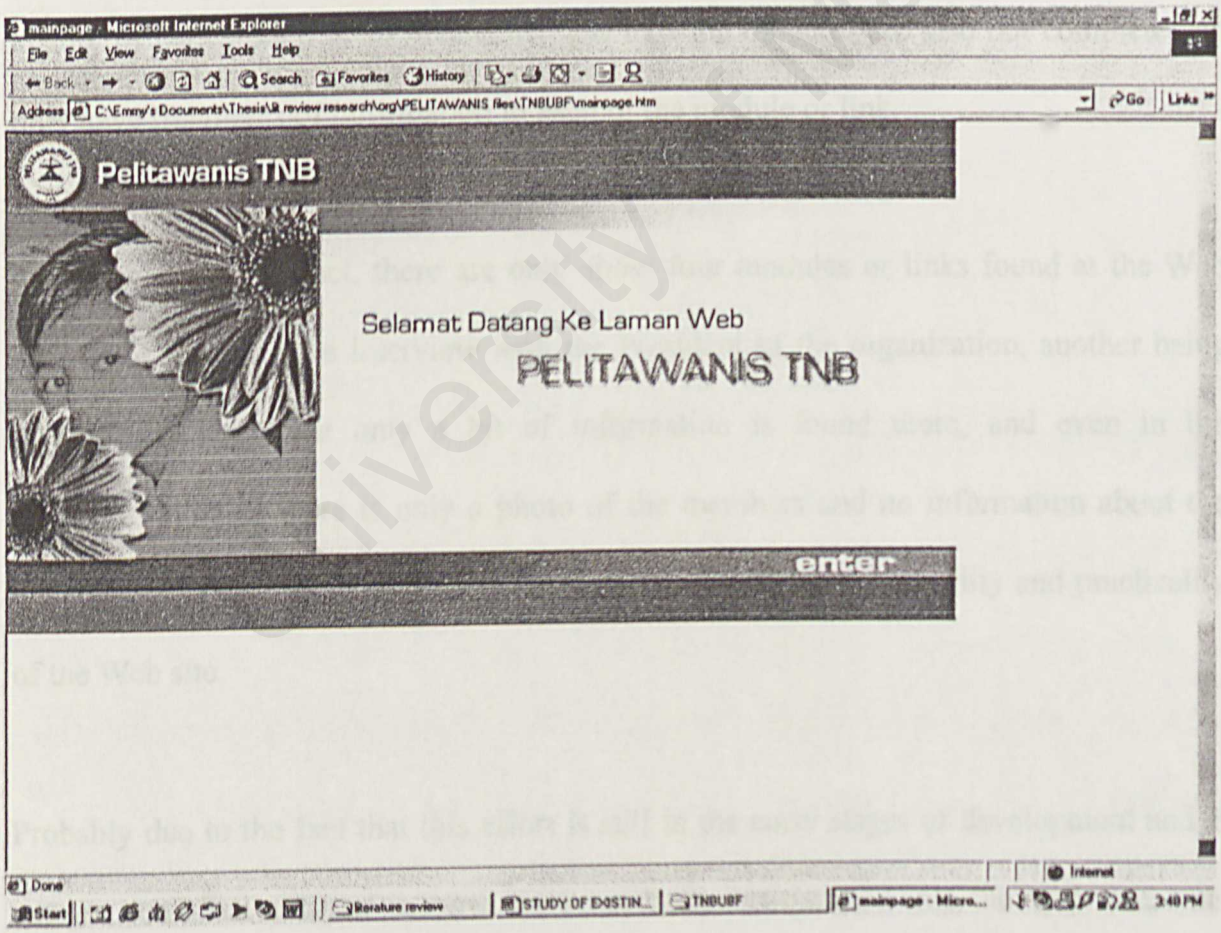


Figure 2.3: The Main Page of the PELITAWANIS TNB (new) Web site

The PELITAWANIS TNB is the same organization as the aforementioned (in (b)). However, the Web site being analyzed here is a different one from the Web site previously mentioned. It is very likely that this Web site is being developed separately from the first Web site and attempts to bring across a new image and style of presentation. This Web site is part of the portal that was developed for the Distribution arm of TNB, also known as TNBD.

While this Web site is more appealing in terms of the design, layout and color scheme used and in the overall structure compared to the previous Web site, it is still very limited in its functions and features. Even a main page to introduce the organization and its history or background is not available. The existing modules are also not complete and only have fragments of information in each of the module or link.

To demonstrate this fact, there are only about four modules or links found at the Web site, one containing the interview with the President of the organization, another being the hobbies page, but only a bit of information is found there, and even in the organization page, there is only a photo of the members and no information about the members or organization is given. This weakness degrades the usability and practicality of the Web site.

Probably due to the fact that this effort is still in the early stages of development and is not yet complete, a lot of features have not been incorporated into the Web site, thus

hampering efforts to make this Web site more useful to its members and also visitors alike.

(d) Sisters In Islam (SIS)

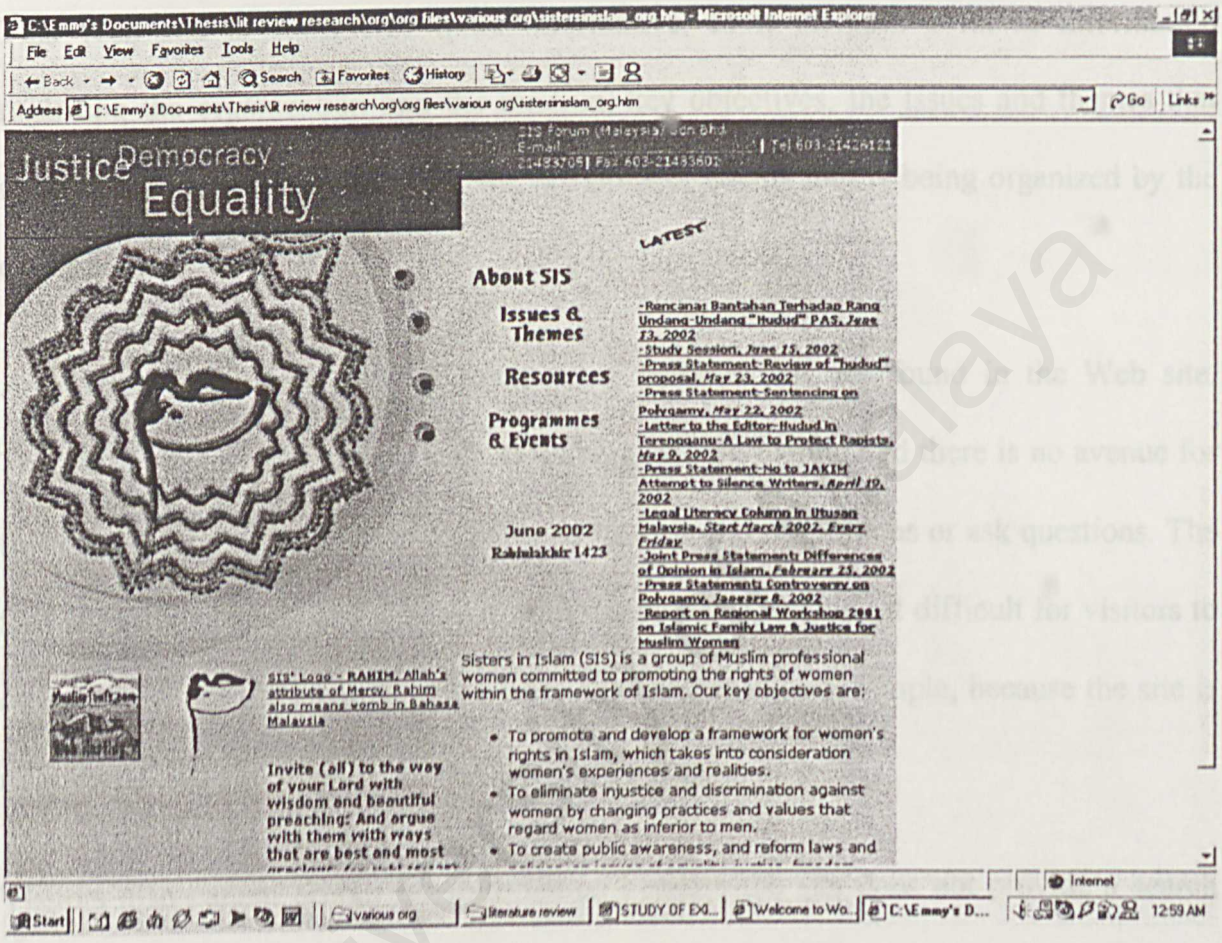


Figure 2.4: The Main Page of the Sisters in Islam (SIS) Web site

Sisters in Islam (SIS) are a group of Muslim professional women committed to promoting the rights of women within the framework of Islam. Their key objectives are to promote and develop a framework for women's rights in Islam, which takes into consideration women's experiences and realities, to eliminate injustice and discrimination against women by changing practices and values that regard women as inferior to men as

well as to create public awareness, and reform laws and policies, on issues of equality, justice, freedom, dignity and democracy in Islam.

Source: Sisters in Islam. (2002). Available at: http://www.sistersinislam.org.my/

This Web site is considered quite informative, as it includes a lot of information regarding the organization and the mission, key objectives, the issues and themes that they are concerned with and also the activities or events that is being organized by the organization.

Apart from that, there are not many other features that are found in the Web site. Therefore, visitors are limited only to looking up information and there is no avenue for them to actually communicate and give comments and suggestions or ask questions. The font used is too small and display is a bit too crowded, making it difficult for visitors to read or view the information given there. Navigation is quite simple, because the site is relatively small and doesn't contain many Web pages.

Visitors also cannot search for information because the site does not provide a search facility for the use of the visitors. This Web site may be sufficient in the context of giving out information regarding SIS, but visitors will probably not visit this site very often due to the limitations in the Web site.

(e) Newwomen.net

Source: Newwomen.net. (2001). Available at: http://www.newwomen.net/

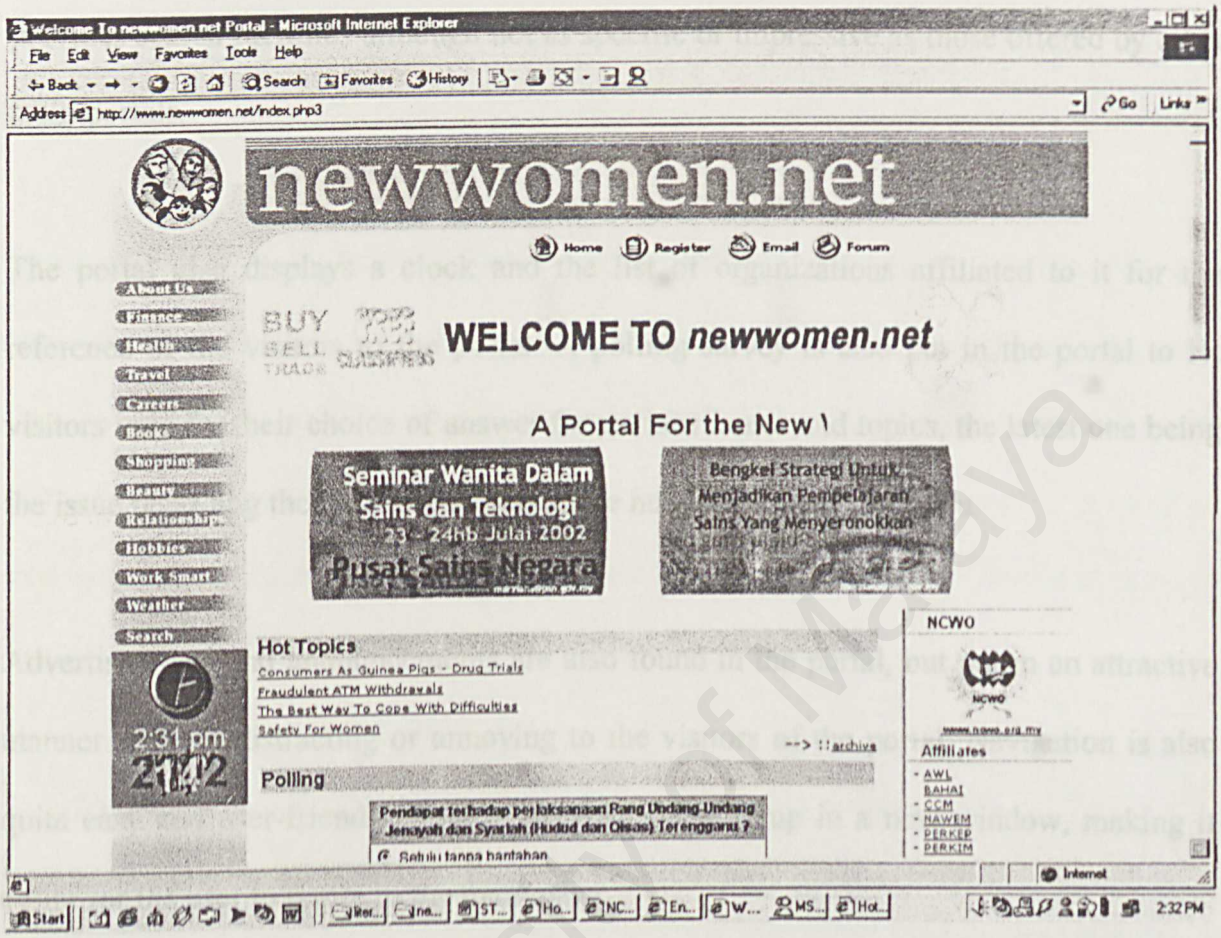


Figure 2.5: The Main Page of the Newwomen.net Portal

The newwomen.net is a women's portal of the National Council of Women's' Organizations set up under the networking women project.

This portal is one of the more complete and well-designed portals that have been studied so far. The color scheme used is very bright and even the scroll bar also changes color when dragged. The overall layout is nicely done and many interesting topics are included in the portal. Among the topics that are given attention to are finance, careers, beauty,

relationships, shopping, books, hobbies, work smart, an even a section on weather whereby users can get the latest weather update from clicking on the link. The portal also provides search facilities although not as specific or impressive as those offered by other main portals.

The portal also displays a clock and the list of organizations affiliated to it for the reference of the visitors to the portal. A polling survey is also put in the portal to let visitors vote for their choice of answer for various issues and topics, the latest one being the issue regarding the implementation of the hudud law in Terengganu.

Advertisements and announcements are also found in the portal, but put in an attractive manner and not distracting or annoying to the visitors of the portal. Navigation is also quite easy and user-friendly, with most links opening up in a new window, making it easier for the user to return to the main page.

This portal is unique in that it is one of the very few portals provided or developed for women (from what the author has analyzed thus far) that have a forum page to facilitate communication between and among visitors, members and also the administrators of the portal. It also provided an online registration form and made it possible for people to get in touch with the Webmaster and other important figures via e-mail (automatically connects to Outlook Express).

Another interesting feature is the questionnaire or survey form that was put in the portal. This is a good and cost effective way to collect information from the visitors, provided that the people who filled them out were truthful and had the objective to sincerely help with the survey.

However, due to the fact that this portal is not specifically developed or designed for one particular organization even though it is under the National Council of Women's Organization, there is not much information regarding the organization or regarding the networking women project and other relevant information about the history or purpose of setting up this portal. Perhaps this aspect of the portal can be further improved to provide visitors some idea as to how and why this portal came about.

(f) National Council for Women's Organization (NCWO) Malaysia

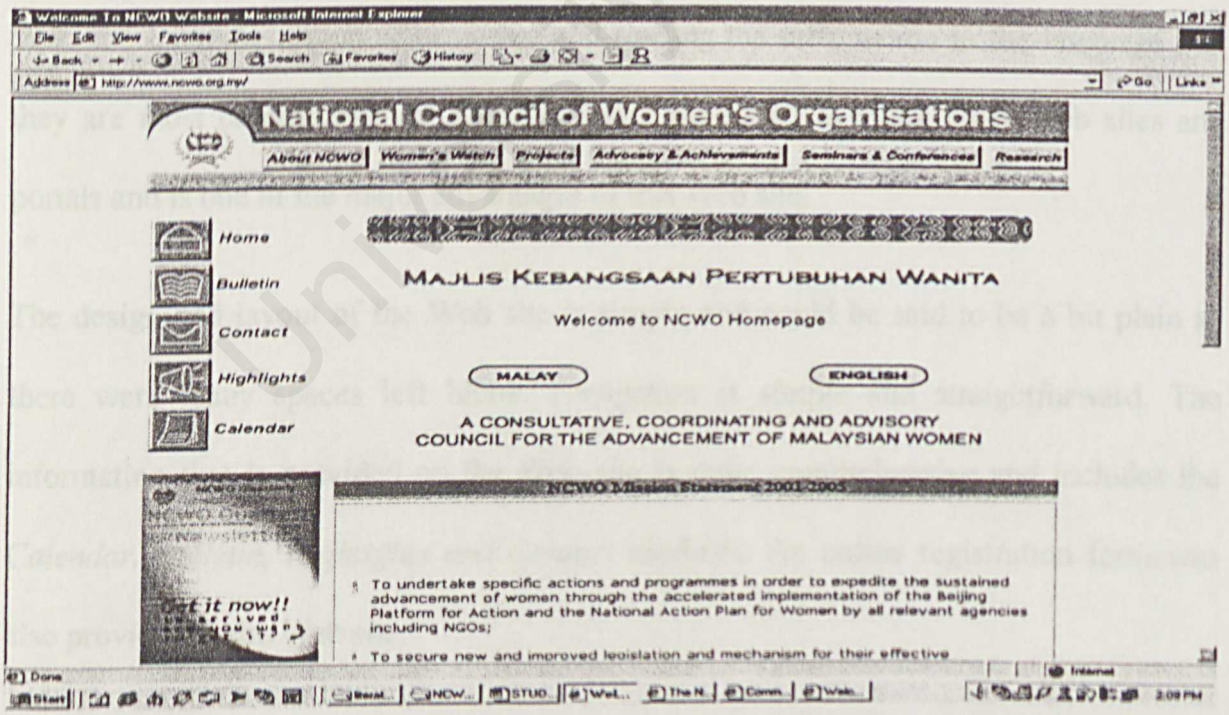


Figure 2.6: The Main Page of the NCWO Malaysia Web site

The National Council of Women's Organizations (NCWO) is the consultative and advisory body for women's organizations affiliated to it. The sustained and dynamic leadership NCWO has given to women's organizations has enabled them to pursue programs in an even numerous tasks both at home as wives and mothers and in their work; in education, in upgrading the quality of schooling; the elimination of legislation that discriminate against women; in the economy and employment sectors as valuable contributors to national economic development and in politics where active involvement of women has been encouraged and the area of violence against women.

Source: About Us - National Council of Women's Organizations (NCWO) Malaysia. (2001). Available at: http://www.ncwo.org.my/

One of the features that are useful and practical is the availability of most of the Web pages and content in two languages, i.e. Bahasa Malaysia and English. Visitors to the Web site have the option of browsing and reading the information in the language that they are most comfortable in. This feature is not found in many other Web sites and portals and is one of the major advantages of this Web site.

The design and layout of the Web site is simple and could be said to be a bit plain as there were many spaces left blank. Navigation is simple and straightforward. The information that is provided on the Web site is quite comprehensive and includes the *Calendar, Bulletin, Highlights and Contact* modules. An online registration form was also provided in the Web site.

The Web site is quite informative and contains a lot of information about the organization and also their objectives, detailed information and charts of the organizations leadership and office bearers, news regarding the seminars and conferences that are being conducted by the organization, their projects, and many more information regarding the issues and topics that are considered important to the organization.

Basically, this is a no-frills Web site that serves its purpose of giving out information about the organization well. With further improvement and enhancement, this Web site can be made more interesting and comprehensive to attract more visitors to the site and also improve the Web site's overall effectiveness.

(g) National Council of Women's Organization (NCWO)

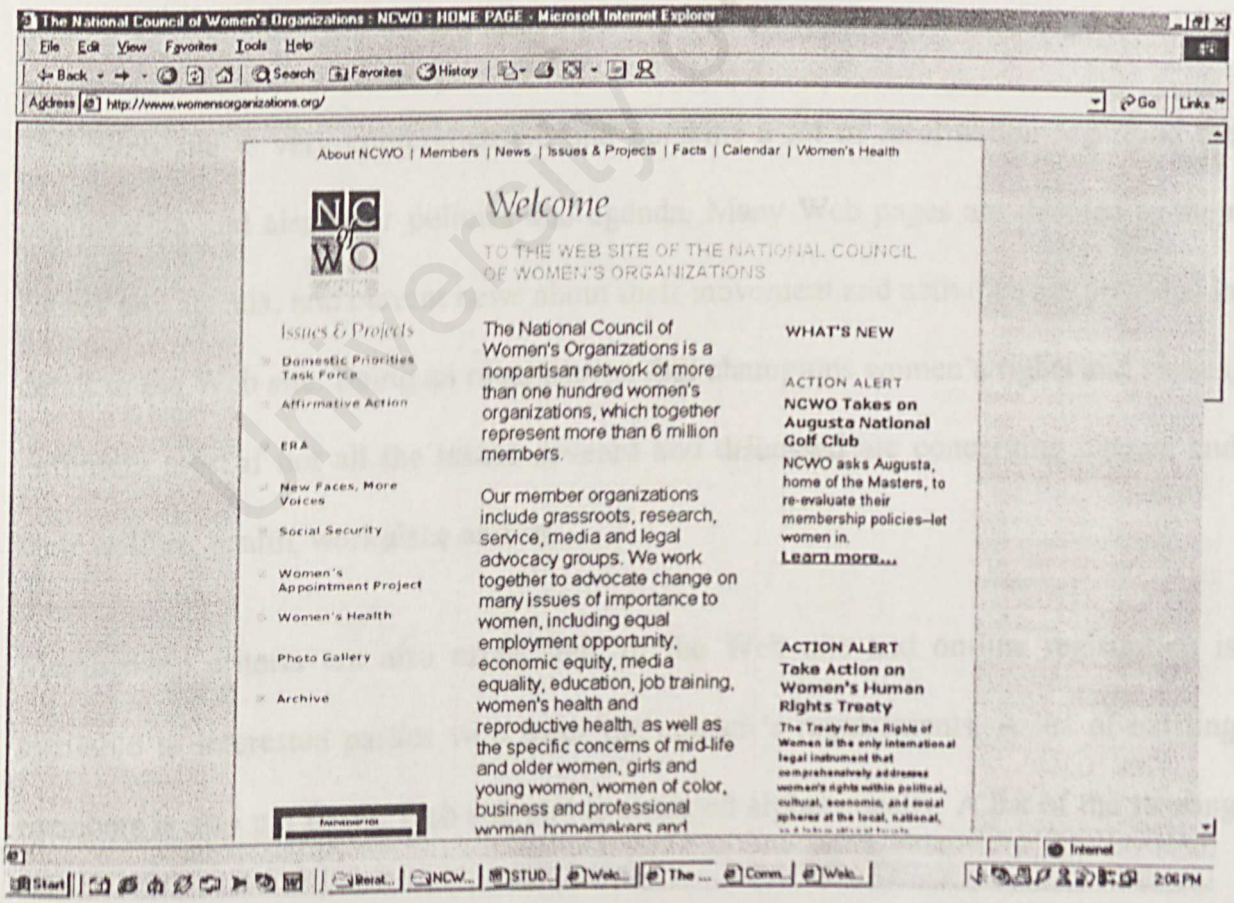


Figure 2.7: The Main Page of the NCWO Web site

The National Council of Women's Organizations focuses primarily on promoting public policy issues of concern to the over 100 organizations that comprise our membership. Membership in the Council is diverse and includes organizations working on a broad spectrum of issues including equal employment opportunity, economic equity and development, education and job training, reproductive health, as well as the specific concerns of mid-life and older women, girls and young women, women of color, religious women, business and professional women, homemakers and retired women. Organizational members include grassroots, research, service and legal advocacy groups. The Council brings together like-minded organizations to advocate change in specific arenas through its various task forces (, 2002).

Source: National Council of Women's Organization. (2002). Available at:

http://www.womensorganizations.org/

This Web site is very comprehensive and contains a lot of information regarding the organization and also their policies and agenda. Many Web pages are devoted to their causes and agenda, and current news about their movement and activities are provided in detail in the Web site. Being an organization that champions women's rights and causes, definitely most if not all the issues covered and discussed are concerning women and their welfare, health, workplace and etc.

Membership criteria are also established in the Web site and on-line registration is available to interested parties who meet the council's requirements. A list of existing members is also put in the Web site and is arranged alphabetically. A list of the steering

committee of the NCWO including names, positions and e-mail addresses is also found on the Web site.

A calendar of activities is also one of the features that are available in the Web site. The calendar can be viewed by day, month or year and lists events hosted by the members of the NCWO. The calendar is presented as a useful service for planning and to encourage participation from the NCWO organizations.

The overall design and layout of the Web site is good and systematically done, therefore helping users in the navigation of the Web site. For a Web site that contains a considerable amount of information, the navigation is considered simple and there are many headers and links provided to help users navigate through the pages with ease.

(h) National Organization for Women (NOW)

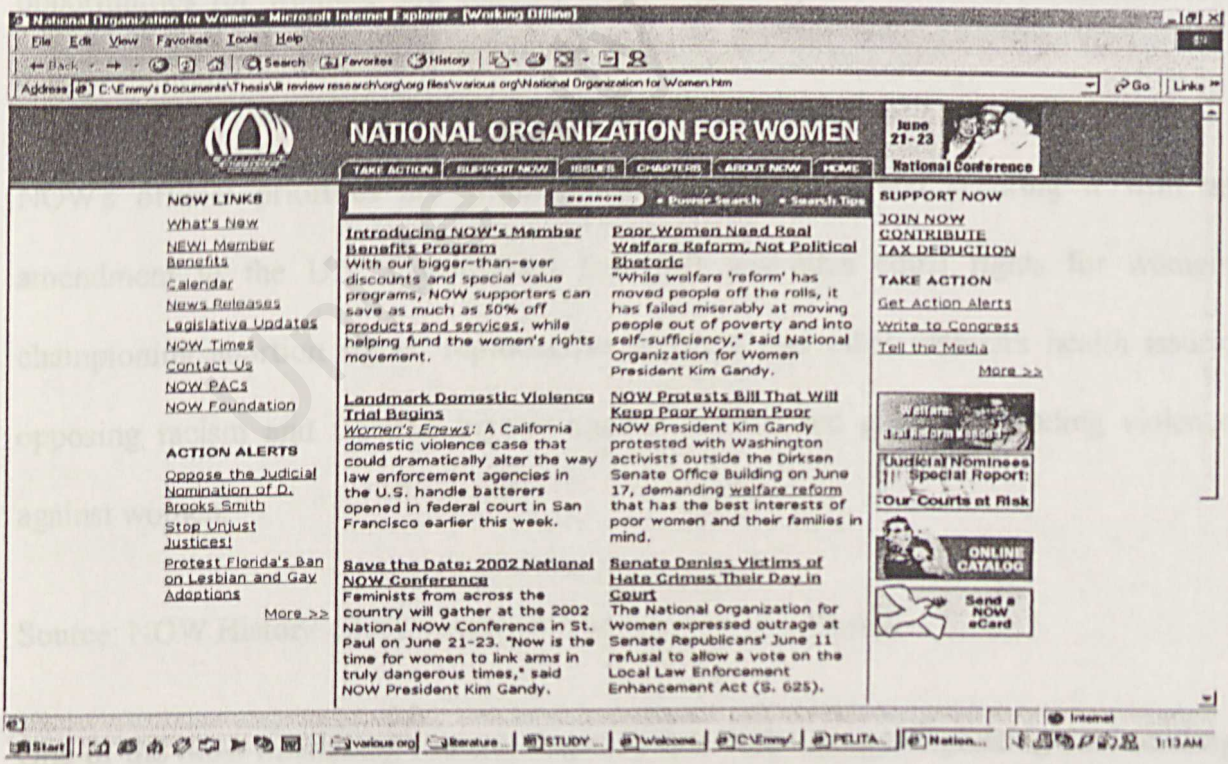


Figure 2.8: The Main Page of the NOW Web site

The National Organization for Women is the largest organization of feminist activists in the United States. NOW have 500,000 contributing members and 550 chapters in all 50 states and the District of Columbia. Since its founding in 1966, NOW's goal has been "to take action" to bring about equality for all women. Both the actions NOW takes and its position on the issues are often unorthodox, uncompromising and ahead of their time.

NOW activists use both traditional and non-traditional means to push for social change. NOW activists do extensive electoral and lobbying work and bring lawsuits. They also organize mass marches, rallies, pickets, and non-violent civil disobedience and immediate, responsive "zap" actions.

These ongoing efforts established NOW as a major force in the sweeping changes that put more women in political posts; increased educational, employment and business opportunities for women; and enacted tougher laws against violence, harassment and discrimination.

NOW's official priorities are winning economic equality and securing it with an amendment to the U.S. Constitution that will guarantee equal rights for women; championing abortion rights, reproductive freedom and other women's health issues; opposing racism and fighting bigotry against lesbian and gays; and ending violence against women.

Source: NOW History. (2002). Available at: http://www.now.org/

One of the most interesting features found in this Web site is the greeting card sending service that is provided here. What is more impressive is that the selection of cards are

actually specially tailored to the organizations causes and concerns, and not just linking the Web site to another e-card service site. This is one of the very few organizations studied so far to use this method to promote awareness of the campaigns and activities that they are carrying out. This is something that is cost-effective and is a good idea to emulate.

There is also an online catalog of products that are being sold by the organization as part of their effort to increase their funding and also as a way for the society to contribute to the organization. The catalog is much like an online shopping site, and customers are given the option to choose products and put it into the shopping basket. A search facility is also provided, with the option of using power search and also search tips.

This feature is very interesting and the author is considering including this in the proposed PELITAWANIS TNB Portal.

The basic layout and design of the Web site is fairly simple and plain. The color scheme used is also quite neutral and is not too striking. Most of the Web site is devoted to providing details of their activities and their efforts to help women fight discrimination and get better rights.

Other than the e-card and catalog services, there are not many other features included in the Web site.

(i) Singapore Council of Women's Organization (SCWO)

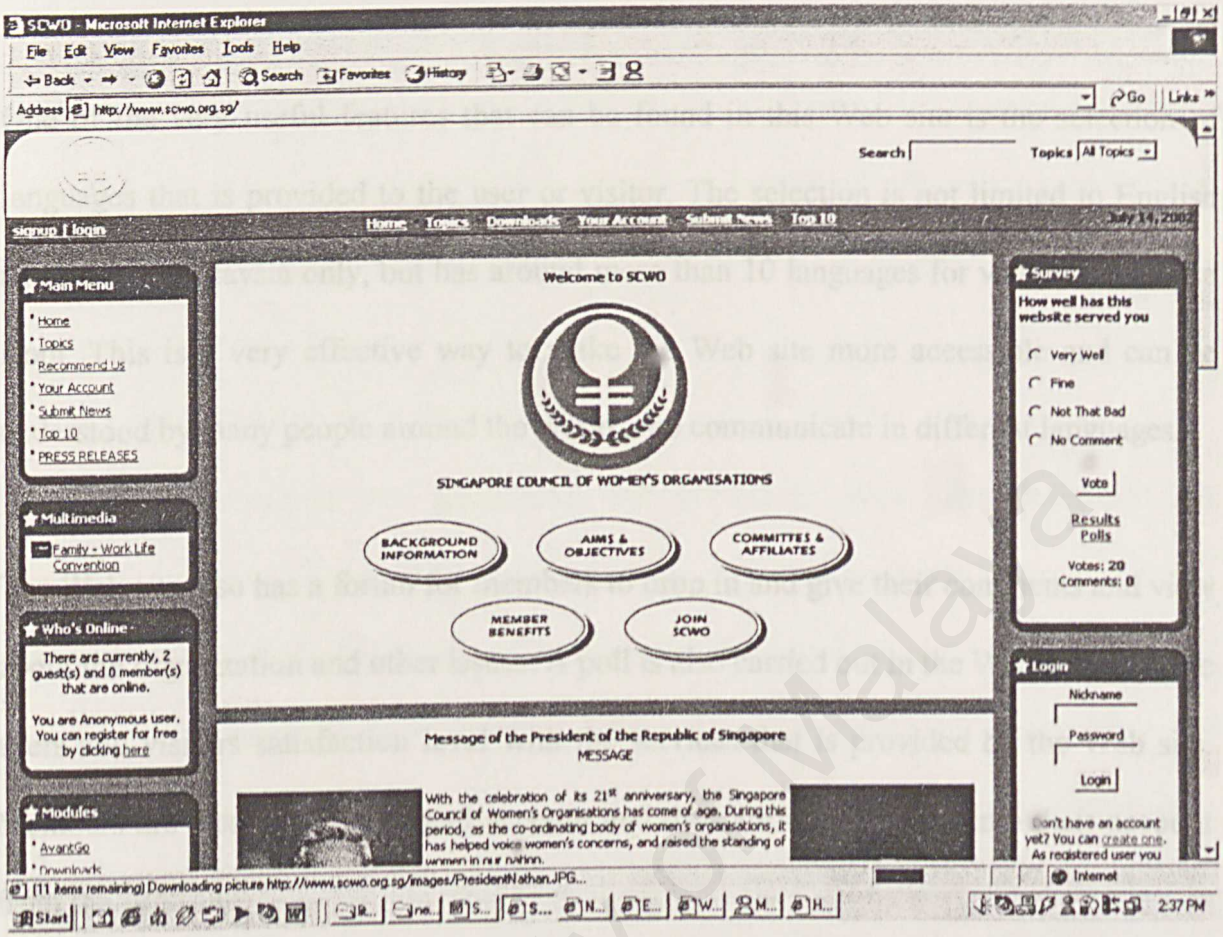


Figure 2.9: The Main Page of the SCWO Web site

The Singapore Council of Women's Organizations (SCWO) is a coordinating body of women's organizations and is managed by an Executive Board comprising elected representatives from affiliated member organizations. As of 31st December 2001, the SCWO has 45 affiliates with an approximate membership of 100,000 women in all walks of life. Membership is open to all women's organizations, associations and clubs who subscribe to the aims and objectives of the SCWO. They are accredited as the national coordinating body of women's organizations in Singapore and act as the non-governmental representative in the ASEAN Women's program (AWP).

Source: Background Information - SCWO. (2002). Available at: http://www.scwo.org.sg/

One of the very useful features that can be found in this Web site is the selection of languages that is provided to the user or visitor. The selection is not limited to English and Bahasa Malaysia only, but has around more than 10 languages for visitors to choose from. This is a very effective way to make the Web site more accessible and can be understood by many people around the world who communicate in different languages.

The Web site also has a forum for members to drop in and give their comments and view about the organization and other issues. A poll is also carried out in the Web site to gauge users and visitors satisfaction level with the services that is provided by the Web site. Members are also given an e-mail account and they are able to login into their account from the Web site.

A search function incorporating power search and download facilities is also included in this Web site. Apart from that, an electronic feedback form is prepared for anyone to give their comments and to send it to the organization.

Frequently asked questions (FAQ) are also listed in one of the Web pages, and many other interesting features such as reviews and stories archive are found in the Web site. The stories are sorted by the month of publication and the reviews are rated in the form of Top 10 reviews in terms of popularity and also the most recent reviews. A calendar of events is also nicely put up for the reference of the members and visitors to the site.

Overall, this Web site is nicely designed and a lot of interesting modules are incorporated in this Web site. The only drawback could be the overload of information that might threaten some visitors, as there is quite a substantial amount of information found on the Web site, especially in the stories archive.

2.5 LITERATURE REVIEW SUMMARY

From what the author has discovered, the portals or Web sites developed for organizations that are operating internationally or based in other more developed countries such as the United States of America and Singapore are better compared to the ones being developed for our local organizations. This is mostly in the areas of diversity of features and functions that can be found in the Web site, for example, some sites offer e-card sending services, forums and things like that. Of course, there are exceptions to this, as there are also portals that are well designed and full of useful features, but by and large, most of the local portals lack functionality and are not comprehensive enough.

In terms of information given, most Web sites are quite satisfactory and provided a lot of relevant and up-to-date information in their Web sites. There is not much difference between the local sites and non-local sites in these criteria.

In conclusion, most of the Web sites and portals are mainly developed and designed to merely as a way to disseminate information regarding the organization, for instance, for members and other interested parties to obtain information regarding the organization's

activities, updates and other information related to the organization. Not many organizations have included features such as bulletin boards, forum, online registration, and other multimedia applications in their Web site. This is probably because the organization feels that the primary focus of their Web site is to provide information, therefore not much attention is given to the inclusion of other features and functions. Therefore, it is the ambition of the author to create an information portal with a difference that incorporates interesting and useful features to benefit all who visits the portal.

From the analysis and synthesis of the existing Web sites of women's organizations found on the Internet, the author has decided to incorporated the good features that were introduced in the various Web sites. The full list of features is found in Table 2.3.

Table 2.3: The Features to be Included in the PELITAWANIS TNB Portal

No.	Features
1	Administration
2	Forum/Bulletin Board
3	User Feedback
4	Links to other women's organizations
5	Members List
6	Members Update
7	Search

Table 2.4: Matrix Table of Women's Organizations Web Sites and the Features Found on it

No.	Organization	Address	Date Published	Features				
				Search Function	Online Registration	Links	Language options	Forum
1	WAO	http://www.wao.org.my/	2000	No	No	Yes	No	No
2	PELITAWANIS TNB (old)	http://www.tnb.com.my/pelitawanis	2002	No	No	No	No	No
3	PELITAWANIS TNB (new)	http://www.tnbubf.com.my/pelitawanis	2002	No	No	No	No	No
4	SIS	http://www.sistersinislam.org.my/	2001	No	No	No	No	No
5	Newwomen.net	http://www.newwomen.net/	2001	Yes	Yes	Yes	No	Yes
6	NCWO Malaysia	http://www.ncwo.org.my/	2001	No	Yes	No	Yes	No
7	NCWO	http://www.womensorganizations.org/	2002	No	Yes	Yes	No	No
8	NOW	http://www.now.org/	2002	Yes	No	No	No	No
9	SCWO	http://www.scwo.org.sg/	2002	Yes	No	No	Yes	Yes

The table above lists the name of the women's organizations studied, its address and date published, as well as the features that were included in the respective women's organizations portal (Web site).

CHAPTER 3: METHODOLOGY

This chapter presents the methods and techniques used in the development of this system, particularly on the fact-finding techniques and data collection analysis to facilitate the development of the PELITAWANIS TNB Portal.

3.1 FACT-FINDING TECHNIQUES

Also known as data collection or information gathering, fact-finding techniques are the formal process of using clear reasoning and researching techniques methodologies to collect information about systems, requirements and preferences for a system development project. In this case, the information that needs to be collected is regarding the PELITAWANIS TNB Portal requirements, its functions and modules and also the users' needs and preferences.

Various fact-finding techniques such as the sampling of existing documents and hard data, site visits, interviews, observation, questionnaires, prototypes, and others can be used to gather the needed information. The process of gathering information is most crucial to two development phases, namely the systems planning and systems analysis phases.

The implementation of different techniques will yield different results, with each technique having its own strengths and weaknesses. Therefore, a combination of a few techniques are used in the development of this project to increase both the effectiveness and efficiency in gathering factual information with regards to the PELITAWANIS TNB

Portal. Together, these techniques provide a comprehensive factual and analytical approach that greatly helps in determining the requisite requirements of the system.

One of the key steps in the development of this project is to elicit information from the existing and potential users, which are mainly the members of the PELITAWANIS TNB Organization. Therefore, the author has examined both quantitative and qualitative information from the fact-finding techniques to paint a more accurate picture of the proposed project.

3.1.1 Utilizing Printed Materials

Printed materials have long been one of the main sources of information in any project or research. There are a wide variety of printed materials available such as books, encyclopedias, almanacs, journals, periodicals, yearbooks, magazines, handbooks, manuals, directories, dictionaries, conference proceedings and many others. All of these materials were written to cater to a specific group of audience.

Not all of the materials mentioned above contain information that is relevant to the development of this system. The author mainly relied on reference books and journal articles to obtain information regarding the terms, definitions, concepts and research activity in the area of information portal development.

Printed materials remains as the most authoritative and reliable source of information even with the emergence of the Internet and other electronic materials.

3.1.2 Utilizing Internet and Electronic Materials

The U.S. Department of Defense laid the foundation of the Internet roughly 30 years ago with a network called ARPANET. But the general public didn't use the Internet much until after the development of the World Wide Web (WWW) in the early 1990s. The World Wide Web came into being in 1991, thanks to developer Tim Berners-Lee and others at the European Laboratory for Particle Physics, also known as Conseil Européenne pour la Recherche Nucléaire (CERN). As recently as June 1993, there were only 130 Web sites (A brief history of the Internet, 2001). Now the WWW has grown to enormous proportions and there are millions of Web sites available.

No one authority controls the World Wide Web. Today's Web site authoring tools allow virtually anyone who has access to a computer and the Internet to post a Web site and contribute to the definition of what this medium is and what it can do. It is a well-known fact that the Internet is the most efficient medium for publishing and sharing data (Tips on establishing your online presence, 2001). An immeasurable amount of data can be found on the Internet, but it is unorganized and chaotic due to the lack of control and organization by a specific authority. With more than 350 million documents available on the Web alone, finding relevant information online can be daunting (The ABCs of Web Site Evaluation, 1999). However, the Internet still contains a substantial amount of useful information including academic and research information. The challenge is to accurately retrieve the relevant and wanted information from the Web and distinguishing it from other irrelevant sources of information.

others, and the very task of locating that information is tedious and time consuming. According to Katz (1992), it has flooded so much irrelevant data that the precise facts to help one are lost.

However, the Internet has contributed to the increase of available resources that are easily accessible despite its problems and setbacks. It has helped to speed up the process of finding information that is important to the development of the PELITAWANIS TNB Portal thus allowing more time to be spent on other processes such as analysis, and interpretation of the information and also project documentation.

3.1.3 Interviewing

Interview is defined as a meeting with a person whose views are requested (Ruse, 1989). Gathering information through interviews is no easy feat, as one has to take into consideration the circumstances of the interview and also the personal biases and perceptions of the person being interviewed. Many factors come into play when obtaining information from an interviewee. The framework of the person's education, intellect, upbringing, emotions and ethics will all serve as influential filters during the interview.

Some of the unique types of information that are obtained from interviews are the respondent's opinions, feelings, goals and informal procedures (Kendall & Kendall, 1999). Other than that, a person may also be asked regarding the nature of his work and other relevant information that concerns the person's position and duties in a particular organization or work environment.

Interviewing the stakeholders of the PELITAWANIS TNB Portal is by far the most effective way to elicit requirements and to understand the ideal system's functions and design. It is quite difficult to carry out due to the time constraints and logistic problems faced by the author. It is also a tricky task to actually get the relevant information from the respondents, as they do not have an exact idea of what the PELITAWANIS TNB Portal should or should not incorporate.

The author has divided the process into three parts; namely the preparation before the interview, the interview session itself and also the follow-up and review after the interview. The author met up with several of the stakeholders including the management of TNBG Prai and also members of the PELITAWANIS TNB Organization (Butterworth Branch).

A list of questions is prepared before the interview so that the interview can be carried out smoothly and it will lessen the probability of the author missing out on important areas or questions that need to be answered (refer to Appendix A: Interview Questions). The interview is followed by a discussion session with the interviewees. All the information from the interviews are then examined and documented accordingly. The findings and analysis of the information from the interview are later sent to the interviewees so that they will also know the results of the interview. This helps to maintain a good rapport with the interviewees and they will at least feel appreciated and that they did not waste their time during the interview.

3.2 DATA COLLECTION ANALYSIS

The author has carried out interviews with two committee members of the PELITAWANIS TNB Butterworth Branch, Puan Juriah and Puan Azmah to find out their opinions on the proposed portal.

The interviews were conducted separately due to the logistic problems faced while the author was in Prai to collect information. Puan Juriah is stationed at the TNBD office in Butterworth, while Puan Azmah works for TNBG Prai. The author went to meet the two interviewees at their workplace and conducted the interview there.

In general, both of the interviewees agreed to the management's proposal to develop a portal for PELITAWANIS TNB. They felt that the portal would benefit the members especially in the dissemination of information (usually the latest updates) regarding the activities organized by the organization. Puan Juriah suggested that features like forum be included in the portal. However, they were concerned about the level of IT skills of the members, but were reassured when the author explained that the portal would be very user-friendly and training would be provided to the users. They agreed that the most important thing is to make sure the portal can be used by all of the members and not only for a small group. They are eagerly waiting for the completion of the portal.

CHAPTER 4: SYSTEM ANALYSIS

The first part of this chapter presents the functional and non-functional requirements that are needed in developing this system. The functional requirements are registration, forum, search, tracking and display, user maintenance, user guide and information management. Non-functional requirements are made up of the Graphical User Interface (GUI), portability, usability, manageability, scalability, response time, reliability, and robustness.

The second part of the chapter discusses the hardware and software consideration for this system. The author tries to analyze the different options that are available in the market and proceeds to choose the most suitable tool for the purpose of this system. Database, development platform, web development technologies, web application software and the development server requirements are among the topics touched here. The reasons and justifications for choosing the respective tool and technology are also included.

4.1 DEFINING REQUIREMENTS

This part of the system analysis describes the functional and non-functional requirements of the PELITAWANIS TNB Portal.

4.1.1 Functional Requirements

According to Pfleeger (2001), a functional requirement is a core system service expected by the user and it describes an interaction between the system and its environment. From a technical viewpoint, functional requirements are functions that are system must offer

specifically in order to fulfill the needs of the users. The functional requirement describes how the system should behave when initiated by certain stimuli or input. All of the functional requirements for the PELITAWANIS TNB Portal are presented as follows:

(a) Log in and Registration

Users must log in to the PELITAWANIS TNB Portal (this is automatically done when the users log in to the Windows 2000 Platform using a valid Login ID and Password) before they can access the portal. Only authorized users (administrators) who have been given permission to access certain information such as the member list, and other data can view this data and make the necessary updates to the data.

(b) Bulletin Board and Forum

One of the unique features in the PELITAWANIS TNB Portal is the bulletin board and forum incorporated in the portal. Users can communicate with each other by posting notes on the bulletin board or by joining in the discussions that are being held in the forum.

(c) Search

The search feature or function that will be incorporated in the PELITAWANIS TNB Portal is to search for information outside of the portal itself. This means that this search is not for users to search for information contained in the site. The search feature will link users to a powerful search engine that can facilitate the search process required by users. The author feels that due to the narrow scope and limited

information in the portal, hyperlinks and headings are sufficient to guide users in the process of looking for the information that they need in the portal.

(d) Tracking and Display

The PELITAWANIS TNB Portal will include an intelligent counter regarding the number of log-ins and the location the access (log in) was made. This information can be stored in the database and reports can be generated when required. This feature is very important to facilitate data mining in the future, whereby these data will be analyzed to reveal certain patterns of user behavior and other useful statistics such as the total number of visitors, the reasons for the log-ins, and which information is most useful to the users.

(e) User Maintenance (Administration)

User maintenance in this context mainly applies to the administrators of the PELITAWANIS TNB Portal. They will be allowed to perform functions such as adding, deleting, editing, updating, and modifying the data or information found in the portal. This feature is required because information changes from time to time and the portal need to keep up with the latest developments. User needs and requirements may also change and the portal needs to be flexible enough to accommodate this change.

(f) User Guide and Information Management

The PELITAWANIS TNB Portal will also provide guidelines and tips on how to use the portal efficiently to achieve their purpose. This comprises a brief introduction of the portal, the core functions and components of the portal, Frequently Asked Questions (FAQ), and etc. The user guide will also include search tips and some detailed instructions to perform some of the more complicated tasks, for instance the administrators will be given instructions on how to update the information in the database and the portal.

(g) User Feedback

Users can provide feedback such as their opinions and suggestions regarding the PELITAWANIS TNB Portal. Textareas and textfields are provided in the user feedback form to allow users to enter their personal particulars, questions and comments regarding the portal. The administrators will process this information and steps will be taken to improve the portal if necessary.

(h) Member List and Update

A list of the registered members of the PELITAWANIS TNB Organization (Butterworth Branch) will be available in the portal to allow viewing by users. The administrators can update the member list.

4.1.2 Non-functional Requirements

Non-functional requirement describes a system's restriction that limits the choices for constructing a solution to the problem (Pfleeger, 2001). In other words, these are the

standards and constraints, which a system must operate under and be fulfilled as parts of the system development. The following are the non-functional requirements for the PELITAWANIS TNB Portal:

(a) Graphical User Interface (GUI)

The PELITAWANIS TNB Portal will incorporate an attractive and user-friendly interface with WIMP (Window, Icon, Menu, and Pointing device) features. The overall design uses a color scheme that is pleasing to the eye and contrasts are carefully planned so that the display is clear and interesting. This is to ensure that users will feel comfortable and at ease while reducing the possibility of frustration due to the difficulty in using the system. Menu-driven and hyperlink-driven mechanisms will provide a standard navigation interface for the users in a systematic way. The notification messages are also accurate, concise, clear and simple so that users understand the message and the implications of the options provided in the messages. This is especially important since most of the users are novice users and do not have much knowledge in this field.

(b) Portability

The PELITAWANIS TNB Portal must be able to operate across various platforms. This feature will make it much easier for the users to access the Web portal without having to worry about the compatibility of the portal with their existing computers and systems. Thus, the portal can operate on various proprietary platforms without any modification, recompiling, reconfiguration or redesign of any component.

(c) Usability

The PELITAWANIS TNB Portal must prove to be useful and beneficial to its users. It must be able to provide the information and services that are needed quickly, and with minimum fuss. It should not in any way hinder or limit the user from carrying out the desired operations, such as retrieving data from the databases, as long as they are authorized to do so.

(d) Manageability

The hardware and software applications of the PELITAWANIS TNB Portal must be proficient to be managed effortlessly and easily operated. This is crucial to ensure that future maintenance and enhancements can be done on the system without having major problems.

(e) Scalability

The ability of the system to migrate or adapt to machines with greater or lesser power, whether as a server or client, is what this feature is all about. This means that the system will be able to expand or decrease in size and capacity depending on the needs of the users. Using hardware, application configuration, or a combination of both the hardware and application configuration the PELITAWANIS TNB Portal can be scaled.

(f) Response Time

The response time of the system should always be in the acceptable range even when there are many users using the system concurrently. One of the methods to ensure that the users are satisfied with the response time is by using better and faster hardware components. This will be discussed later in the hardware consideration section of this chapter.

(g) Reliability

As with any other system, reliability of the system is one of the key things users look for when using the PELITAWANIS TNB Portal. When the system is reliable, all the functions will be executed precisely and smoothly. High reliability will promote user confidence in the system and will encourage them to use the system more frequently, and they trust that the system will meet their needs efficiently. The author will carry out thorough testing to ensure that the system reliability is not compromised in any way, at any time of the implementation or operation.

(h) Robustness

The PELITAWANIS TNB Portal must be robust enough to handle any expected and unexpected system failures. Measures will be taken straight away to detect the failures and rectify the situation immediately. An error will be logged to inform the system administrator of the failure. This can only be achieved through comprehensive testing.

4.2 HARDWARE AND SOFTWARE CONSIDERATION

This section contains the introduction to various the hardware and software components used in the development of this system. Also included are the explanations and justifications of choosing the hardware and software that best suits this project.

4.2.1 Database Management System

(a) Microsoft SQL Server 2000

Microsoft SQL Server 2000 is the latest version of Microsoft's relational database management system (RDBMS) for the Windows platform. It is a complete database and analysis solution solution for rapidly delivering the next generation of scalable Web applications.

The database component of SQL Server 2000 is a Structured Query Language (SQL)-compatible, scalable, relational database with integrated XML support for Internet applications. SQL Server 2000 builds upon the modern, extensible foundation of SQL Server 7.0.

Additionally, SQL Server 2000 takes full advantage of Windows 2000 by integrating with Active Directory Services and supporting up to 32 processors and 64 gigabytes (GB) of Random Access Memory (RAM).

SQL Server 2000 includes a number of features that support ease of installation, deployment, and use; scalability; data warehousing; and system integration with other server software.

(a) Ease of Installation

The installation or upgrade of SQL Server 2000 is driven by a Graphical User Interface (GUI) application that guides users in providing the information that SQL Server 2000 Setup needs. The entire installation or upgrade process is accomplished quickly and with minimal input from the users.

(b) Ease of deployment

SQL Server 2000 reconfigures itself automatically and dynamically while running. SQL Server 2000 can also increase or decrease the size of a database automatically as data is inserted or deleted.

SQL Server 2000 offers database administrators several tools for managing their systems, such as SQL Server Enterprise Manager and SQL Profiler

(c) Ease of use

The SQL Server 2000 database engine is a robust server that can manage terabyte databases being accessed by thousands of users. At the same time, when running at its default settings, SQL Server 2000 has features such as dynamic self-tuning that enable it to work effectively on laptops and desktops without burdening users with administrative tasks.

(d) Scalability

SQL Server 2000 includes several features that extend the scalability of the system. For example, SQL Server 2000 dynamically adjusts the granularity of locking to the

appropriate level for each table referenced by a query and has high-speed optimizations that support Very Large Database (VLDB) environments.

(e) System Integration

SQL Server 2000 works with other products such as Windows 2000 Server, Windows NT Server, and Microsoft Proxy Server to form a stable and secure data store for Internet and intranet systems.

(f) Windows Authentication Support

SQL Server supports Windows Authentication, which enables Windows NT and Windows 2000 user and domain accounts to be used as SQL Server 2000 login accounts. Users are validated by Windows 2000 when they connect to the network. When a connection is formed with SQL Server, the SQL Server client software requests a trusted connection, which can be granted only if they have been validated by Windows NT or Windows 2000. SQL Server, then, does not have to validate users separately. Users are not required to have separate logins and passwords for each SQL Server system to which they connect.

Source: Features – Microsoft SQL Server 2000. (2002). Available at: http://www.microsoft.com/sql/evaluation/features/default.asp

(g) Microsoft Access 2000

Microsoft Access 2000 is a powerful relational database application designed for desktop category users, in particular individuals and workgroups managing large

amounts of data. It includes features that make designing and manipulation of database systems easy and efficient.

Microsoft Access 2000 aids users in generating, analyzing, as well as creating reports in a short period of time. It provides ease-of-use wizards throughout, such as the Database Wizard for getting up and running the database quickly, and the Simple Query Wizard for finding information easily in the database. The combination of ease-of-use and power in Microsoft Access 2000 makes it the top choice among developers who frequently use Microsoft Access as a front-end to SQL Server in a client-server environment.

(h) Microsoft SQL Server 2000 Vs Microsoft Access 2000

The Database Management System (DBMS) chosen for this project is the Microsoft SQL Server 2000. There are a few reasons why this choice was made. Most importantly, the purpose and intended use of the PELITAWANIS TNB Portal has to be considered. The author is taking into consideration the future expandability of the portal and the incorporation of new features, as the users get more familiar with the portal. The Microsoft SQL Server 2000 is more suitable due to its ability to perform the necessary functions with minimum fuss. It is also fully compatible with the Windows 2000 Platform that is currently being used by the client. It also integrates well with the Active Directory Services and provides features that are easy to use, deploy, and scalable.

Microsoft Access 2000 is a good database management system but it is not comprehensive and large enough to fit in all the requirements of the portal. Apart from that, the PELITAWANIS TNB Portal also needs to integrate with other systems, primarily the Company Information Portal, Leave Management System and Claims Management System for TNBG Perai. All of these systems have to be linked together and the Microsoft SQL Server 2000 was agreed upon as the chosen DBMS for these systems.

The comparison between Microsoft SQL Server 2000 and Microsoft Access 2000 can be found in Table 4.1 as shown below.

Table 4.1: The Comparison Between MS SQL Server 2000 and MS Access 2000

Features	**MS SQL Server 2000**	**MS Access 2000**
Data capacity	1 Terabyte per database	1.2 Gigabytes of database
Solution for transaction based database downtime	Automatic rollback, reduction of downtime expenses.	Do not support automatic recovery, loss of data possible.
Backup ability	Dynamic backup	No built-in backup capability
Degree of security	Validation using Windows 2000 or NT. Also uses Login ID and password, user permission and encryption.	Customizable security available depending on developers needs.
Application run time	Fast	Slow
Maximum number of users	32,767	255
Distributed transactions	Yes	No

4.2.2 Development Platform

The development platform is one of the most important component of the software in consideration because it provides support for all the other development tools and programming languages used in the development of this system. Therefore, it is of utmost importance that the chosen development platform must be the best platform for the system, in that can meet the needs and requirements of this system more efficiently and quickly compared to the other platforms in the market.

There are a number of development platforms for developing the client-server applications of this system. The author has weighed the strengths and weaknesses as well as the unique characteristics of two popular development platforms, namely the Microsoft Windows NT Server 4.0 and the Microsoft Windows 2000 Server.

(a) **Microsoft Windows NT Server 4.0**

Microsoft Windows NT Server 4.0 is a multipurpose server operating system. A multipurpose operating system integrates a variety of network services. The services it provides are designed to address customer requirements and are managed in a single way.

This robust operating system (OS) offers dependable file and printing services, while providing the architecture to run powerful client-server applications. With built-in support for communications and Internet services, Windows NT Server 4.0 also includes Internet and intranet capabilities. The new features built into Windows NT Server 4.0 offers more choices for accessing information, especially through a wide

range of built-in Internet tools besides improving communication. The OS also provide users with improved performance at a lower cost. The selected features of Windows NT Server 4.0 are listed in Table 4.2.

Windows NT Server 4.0 interoperates with a broad range of operating systems including Netware, UNIX, Microsoft LAN Manager, SNA and Macintosh.

Table 4.2: The Selected Features of Windows NT Server 4.0

Features of Windows 2000 NT Server 4.0
• File sharing • Support of various protocols • Simple deployment and management • Integrated security • Integrated Web Server (IIS – Internet Information Server) • Complete communication services • Reliability and speed • Network integration services • Low-cost dial up connectivity

Source: Windows NT 4.0 Features (2001, July 13) Available at:

http://www.microsoft.com/ntserver/ProductInfo/default.asp

(b) Microsoft Windows 2000 Server

The Windows 2000 Server Family is the most reliable set of server operating systems Microsoft has ever produced. The reliability improvements in Windows 2000 mean

fewer network interruptions for end users, higher server uptime, and better system availability.

The Windows 2000 Server Family goes beyond providing the essentials, such as file, print, and communications. It is engineered specifically to let companies reliably and economically use emerging technologies to improve business profitability and increase their agility in an ever-changing marketplace.

Building on the solid Internet technologies delivered in Windows NT Server 4.0, Windows 2000 Server provides a well-integrated package containing the application development environment, security, and scalability that developers need to get more out of existing applications. Developers can also build new and versatile solutions using the most complete set of Internet technologies available.

Table 4.3: The Selected Features of Windows 2000 Server

Features of Windows 2000 Server
• Improved Internal Architecture • Fast Recovery from System Failure • Improved Code with Developer Tools • Easier deployment • Easier network configuration • Improved reliability and scalability • Internet ready • Centralized management services • Provide support for wide range of hardware and peripherals • Increased security

Source: Increasing System Reliability and Availability with Windows 2000. (2000, December 5). http://www.microsoft.com/windows2000/server/evaluation/overview/default.asp

(c) Microsoft Windows NT Server 4.0 Vs Microsoft Windows 2000 Server

The Microsoft Windows 2000 Server has all the capabilities and features offered by Microsoft Windows NT Server 4.0, because it is built on the NT technology. It is superior to the preceding Windows NT Server 4.0 in many ways, and is easier to use, deploy, and manage. It is a tightly integrated solution that performs extremely well, besides having strong supporting tools for developers. It is a powerful platform on which to build a reliable and robust portal. Therefore, the Microsoft Windows 2000 Server is chosen over the Microsoft Windows NT Server 4.0 as the main development platform for the PELITAWANIS TNB Portal.

(d) Microsoft SharePoint Portal Server

SharePoint Portal Server is a flexible portal solution that lets users find, share, and publish information easily. With SharePoint Portal Server, businesses are able to utilize existing information effectively, and to capture information in new ways that make sense for their business. In addition, they can rapidly deploy an out-of-the-box portal site and easily use Web-Parts technology to customize a Web-based view of their organization.

Because the SharePoint Portal is comprised fully of Web Parts, it can be easily customized to suit the purpose and preference of the users. With Web Part technology, users can also customize the interface, and manage common resources, such as contacts, calendars, and messages.

Customers can also extend SharePoint Portal Server and add additional Web application functionality. SharePoint Portal Server is designed around industry and Internet standards, such as OLE DB, Microsoft ActiveX Data Objects (ADO), Extensible Markup Language (XML), and HTTP, making it easy for developers familiar with these standards. Due to this support of standards, the use of tools like Microsoft Visual Studio® allows users to integrate Active Server Pages (ASP) functionality into the portal.

SharePoint Portal Server is a document management tool that includes features like document locking, versioning, and publishing and makes these features accessible to the average user. It delivers easy-to-use, document-management features that are integrated with the tools and applications that are used to create and manage documents, with Microsoft Windows® Explorer and Microsoft Office 2000 applications like Microsoft Word, Microsoft Excel, and Microsoft PowerPoint®.

Using SharePoint Portal Server, users can also save and check documents into the document store, capturing business-relevant metadata in Document Profile forms. Users can also tailor forms to their organization. Tracking changes though multiple drafts as a document is edited, reviewed, and approved is accomplished using integrated approval routing. This occurs prior to publishing for public viewing on the

intranet dashboard site. Users can also roll back to a previous version of a document. Features like Document Collaboration, Profiling, Lifecycle Management, and Web-based document management through a browser are also provided.

Small or ad hoc workgroups need informal means to work together on group deliverables, share documents, and communicate status with one another. These groups need to share information easily and effortlessly and SharePoint Team Services–based Web sites allow them to do that.

Large workgroups with structured processes need greater management over their information. They require features like formal publishing processes and the ability to search for and aggregate content from multiple data stores and file formats. For this scenario, SharePoint Portal Server 2001 is recommended.

When organizations offer SharePoint Team Services and SharePoint Portal Server 2001, they can address the information-sharing challenges for both the large and small groups within their enterprise. Together, the SharePoint technologies give users the ability to organize information, readily access that information, manage documents, and enable efficient collaboration—all in a familiar, browser-based and Microsoft Office–integrated environment.

Table 4.4: The Comparison Between Team Services and Portal Server

	Team Services	**Portal Server**
Core Function	Ad hoc information sharing	Enterprise Search
Web Site	Team Web sites	Portal Web sites

	(5–75 users)	(75+ users)
Search Capabilities	Documents within team Web site and sub Webs	Across multiple servers and data types
Discussion and Notifications	Discussions Notifications Surveys	Discussions Notifications
Customization	Browser-based, Microsoft FrontPage version 2002, and SDK	Web Parts and SDK
Document Management	Publishing	Check-in, check-out Versioning Routing Publishing
Client Applications	Browser, Office XP, FrontPage 2002	Browser, Microsoft Windows Explorer, Office 2000 or Office XP
Roles-based Security	Customizable roles: Administrator, Advanced Author, Author, Contributor, and Browser	Administrator, Coordinator, Author, and Reader
Storage	Microsoft SQL Server™	Web Storage System
Licensing	One FrontPage 2002 server license, no separate client access license	Server license and client access licenses (CALs)

Table 4.5: The Three Main Features of Microsoft SharePoint Portal Server

Scalable, Enterprise Search	Integrated Document Management	Customized Portal Solution
Search Engine Retrieve text using state of the art probabilistic ranking. The search engine also features "best bets," property searches, and auto-categorization of crawled	**Office and Windows Integration** A complete set of document management functionality is accessible directly from the Microsoft Office 2000 toolbar and Microsoft	**Digital Dashboard–based Portal** Get flexible, Web Part–based portals using digital dashboard layouts and content interfaces, using third party or your own

content.	Windows® Explorer. This helps users manage documents with familiar tools.	Web Parts.
Data Access and Indexing Crawl and search file and Web servers, Microsoft Exchange Server Public Folders, Lotus Notes servers, and remote servers for SharePoint Portal Server.	**Check-in and Check-out** Enables optional enhanced Web folders so that documents can be reserved by individual users for updating.	**Shareable Personal Dashboards** Easily create customized dashboard sites, and share them with other users.
Subscriptions Subscribe to a document, folder, category, or search query so you are notified when changes are made, in the portal and optionally, by e-mail.	**Document Versioning** Document changes, including metadata such as keywords, are tracked and assigned different version numbers for auditing and rollback.	**Web Storage System** Built-in services for building Web-based collaborative applications.
Categories Classify content under a set of customer-defined categories. This allows easy navigation to information.	**Document Profiling** This captures optional and required metadata about customer-defined document types.	**Standard Tools** Develop solutions using familiar tools like Microsoft Visual Studio®.
Low-Latency Indexing Support manual and scheduled crawls, as well as adaptive and incremental crawling, to ensure that your search results contain the most recent information.	**Document Collaboration** Use the Discussions feature in Office and Hypertext Markup Language (HTML) documents for inline, content review.	**Standard Interfaces** Utilize common interfaces like Microsoft ActiveX® Data Objects (ADO), Extensible Markup Language (XML) and Hypertext Transfer Protocol

		(HTTP), and Web Distributed Authoring and Versioning (WebDAV).
Search Extensibility Search protocol handler interfaces enable connection to custom data sources. Support custom content types through the IFilter interface.	**Security** Using roles built on Microsoft Windows NT® security, SharePoint Portal Server ensures that only users with appropriate access can see a given document.	
	Lifecycle Management Create private drafts, review and revise, then publish, with optional approval routing.	

Source: Microsoft SharePoint Portal Server: Product Overview. (2002). Available at: http://www.microsoft.com/sharepoint/evaluation/overview/default.asp

SharePoint Technologies: Unlocking the power of information. (2001, April 18). Available at: http://www.microsoft.com/sharepoint/evaluation/overview/technologies.asp

4.2.3 Web Development Technologies

Web-based applications rely on many network and application components that work together to deliver information to the requesting client. Technologies that are well suited for a particular project can greatly improve the reliability and performance of the proposed project. Therefore, careful consideration when choosing which development

technology that is to be used in the development of the PELITAWANIS TNB Portal is of utmost importance.

The programming framework chosen for the development of the PELITAWANIS TNB Portal is ASP.NET with VB.NET as the main programming language and VBScript as its main scripting language. VB.NET is used because it's the most desirable programming language and it is by default the programming language for ASP.NET. Apart from that, it is also easier to pick up and implement, as it does not require any additional software.

(a) Active Server Pages (ASP)

ASP, short for Active Server Pages, is a mix of HTML, scripts and ASP code that enables the building of dynamic and database-driven web sites (101 ASP Tutorials, 2002). Microsoft describes it as "a server - side scripting environment that you can use to create and run dynamic, interactive, high - performance Web server applications."

ASP was developed by Microsoft and its core language is based off of Microsoft's Visual Basic. The language ASP uses is VBScript. However, this is optional and developers may use other languages that they are familiar with such as Microsoft's Jscript, Java or C to write the codes.

ASP allows interaction with ODBC compliant databases on the web server, such as Microsoft Access, Microsoft SQL Server, Oracle, Informix or Sybase. Persistent connections between the client and server, the development of client server sessions,

and the access and management of databases from the client side is also possible with ASP.

An Active Server Page is developed in a text file just like a HTML page. Developers can use any text editor to create an ASP. ASP is different from standard HTML in that it allows developers to tailor the information displayed on the page, based upon user interaction. Pages created using ASP is dynamic because it is based on two very important sources of data- user input in conjunction with Microsoft Active Data Objects (ADO) information pulled from a database. ActiveX components can be used as well in ASP pages.

ASP is interpreted at the server instead of by the browser and this is what makes ASP dynamic. By taking user input, connecting to a database or whatever, ASP is translated on the server and outputs pure HTML. Because ASP was designed for Microsoft's NT servers, its default language is VBScript. However, it is good coding practice to always include the specified language of the code at the top of the page, so the server knows how to interpret it.

Chili!ASP is a software product developed by ChiliSoft that facilitates ASP functions on web servers other than Microsoft's IIS web server, such as; Netscape's NT-based web servers like Enterprise or FastTrack, Lotus Domino Go Webserver, or O'Reilly's Website. ASP can also run on a UNIX server, but the UNIX server must be running ChiliSoft.

(b) ASP.NET

	common language runtime interoperability guarantees that the existing investment in COM-based development is preserved when migrating to ASP.NET.
Simplicity	ASP.NET makes it easy to perform common tasks, from simple form submission and client authentication to deployment and site configuration. For example, the ASP.NET page framework allows developers to build user interfaces that cleanly separate application logic from presentation code and to handle events in a simple, Visual Basic - like forms processing model. Additionally, the common language runtime simplifies development, with managed code services such as automatic reference counting and garbage collection.
Manageability	ASP.NET employs a text-based, hierarchical configuration system, which simplifies applying settings to the server environment and Web applications. Because configuration information is stored as plain text, new settings may be applied without the aid of local administration tools. This "zero local administration" philosophy extends to deploying ASP.NET Framework applications as well. An ASP.NET Framework application is deployed to a server simply by copying the necessary files to the server. No server restart is required, even to deploy or replace running compiled code.
Scalability and Availability	ASP.NET has been designed with scalability in mind, with features specifically tailored to improve performance in clustered and multiprocessor environments. Further, processes are closely monitored and managed by the ASP.NET runtime, so that if one misbehaves (leaks, deadlocks), a new process can be created in its place, which

	helps keep the application constantly available to handle requests.
Customizability and Extensibility	ASP.NET delivers a well-factored architecture that allows developers to "plug-in" their code at the appropriate level. In fact, it is possible to extend or replace any subcomponent of the ASP.NET runtime with custom-written components written by the developers themselves. Custom authentication or state services is also easy to implement.
Security	Applications are secure with built-in Windows authentication and per-application configuration.

Source: What is ASP.NET. (2002). Available at: http://www.asp.net

(c) ASP Vs ASP.NET

ASP.NET is currently among the most popular web development technology that has been introduced lately in Malaysia. It incorporates several very interesting features as mentioned above in part (b) that makes it very attractive to developers and users alike. It definitely is an improvement over the previous Web technologies and therefore the author has decided to take advantage of the benefits from ASP.NET and has chosen to use ASP.NET as the main programming framework for the development of the PELITAWANIS TNB Portal.

(d) Extensible Markup Language (XML)

The Extensible Markup Language (XML) is the universal format for structured documents and data on the Web (W3C XML Web site, 2000).

The Extensible Markup Language (XML) is descriptively identified in the XML 1.0 W3C Recommendation as an extremely simple dialect or 'subset' of SGML the goal of which is to enable generic SGML to be served, received, and processed on the Web in the way that is now possible with HTML, for which reason XML has been designed for ease of implementation, and for interoperability with both SGML and HTML.

XML is primarily intended to meet the requirements of large-scale Web content providers for industry-specific markup, vendor-neutral data exchange, media-independent publishing, one-on-one marketing, workflow management in collaborative authoring environments, and the processing of Web documents by intelligent clients. It is also expected to find use in certain metadata applications. XML is fully internationalized for both European and Asian languages, with all conforming processors required to support the Unicode character set in both its UTF-8 and UTF-16 encoding. The language is designed for the quickest possible client-side processing consistent with its primary purpose as an electronic publishing and data interchange format.

Extensible Markup Language (XML), describes a class of data objects called XML documents and partially describes the behavior of computer programs which process them. XML is an application profile or restricted form of SGML, the Standard Generalized Markup Language. By construction, XML documents are conforming SGML documents. Valid XML documents are designed to be valid SGML documents, but XML documents have additional restrictions.

XML documents are made up of storage units called entities, which contain either parsed or unparsed data. Parsed data is made up of characters, some of which form character data, and some of which form markup. Markup encodes a description of the document's storage layout and logical structure. XML provides a mechanism to impose constraints on the storage layout and logical structure.

A software module called an XML processor is used to read XML documents and provide access to their content and structure. It is assumed that an XML processor is doing its work on behalf of another module, called the application

XML was developed by an XML Working Group (originally known as the SGML Editorial Review Board) formed under the auspices of the World Wide Web Consortium (W3C) in 1996. It was chaired by Jon Bosak of Sun Microsystems with the active participation of an XML Special Interest Group (previously known as the SGML Working Group) also organized by the W3C.

XML was designed to support a wide variety of applications, be compatibe with SGML, be straightforwardly usable over the Internet. Programs which process XML documents are easy to write, and the documents are human-legible and clear. Apart from that, XML documents are also easy to create. The design of XML is formal and concise.

Source: XML: Overview. (2002, August 2). Available at:

http://www.oasis_open.org/cover/xml.html

4.2.4 Web Application Software

(a) Macromedia Dreamweaver 4

Macromedia Dreamweaver 4 provides an intuitive User Interface, visual layout tools and text-editing environment, which is easy to use and suitable for any level of users, from beginners to experts.

Macromedia Dreamweaver 4 is a WYSIWYG design tool that automatically generates the HTML code for the user. The user can insert images, controls, scripts, applets, or hyperlinks without having to type any HTML code. However, the user has the option to view the HTML tags and codes that Macromedia Dreamweaver created, much like the Microsoft FrontPage. Therefore, users can make use of both the WYSIWYG design tool and the textual design tool that is provided.

Table 4.7: The Selected Features of Macromedia Dreamweaver 4

Features of Macromedia Dreamweaver 4
1. Code View and Split View
2. Javascript debugger
3. Integrated O'Reilly code reference
4. Layout view
5. Macromedia Flash buttons and texts
6. Asset panel – track all site media in a central location
7. Roundtrip graphics editing
8. Microsoft Visual SourceSafe and WebDAV Integration
9. Site Reporting
10. Macromedia exchange for Dreamweaver

Source: Macromedia - Dreamweaver (2001). Available at:

http://www.macromedia.com/software/dreamweaver/

4.2.5 The Server and Client Requirements

The minimum server and client requirements for the development of the portal is listed below:

Table 4.8: Requirements for the Server

Description	Requirements
Processor	Intel Pentium IV 2.2GHz
Memory	256MB RAM
Hard disk	550MB available hard disk
Operating System	Windows 2000 Server
Web server	Internet Information Server (IIS) 5.0
Display	VGA, Super VGA

Table 4.9: Requirements for the Client

Description	Requirements
Processor	Intel Pentium 200MHz
Memory	64MB RAM
Hard disk	30MB available hard disk
Operating System	Windows 98
Web server	Internet Information Server (IIS) 5.0

4.2.6 Summary of Hardware and Software Consideration

This subchapter summarizes the hardware, software and tools that will be used in the proposed PELITAWANIS TNB Portal. The complete list of software tools and technologies are as follows:

(a) Microsoft SharePoint Portal Server as the main development platform;

(b) Microsoft Windows 2000 Server as the server platform;

(c) Internet Information Server (IIS) 5.0 as the Web server;

(d) Microsoft SQL Server 2000 as the database management system;

(e) Internet Explorer 5.5 as the Web browser;

(f) ASP as the main programming framework

(g) Hypertext Markup Language (HTML) as the Markup language;

(h) VBScript and JavaScript as the scripting language;

(i) Macromedia Dreamweaver as the Web application software; and

(j) Microsoft Word 2000 as the word processor (for documentation purposes).

CHAPTER 5: SYSTEM DESIGN

This chapter presents the system design for the PELITAWANIS TNB Portal. Among the topics included are the system architecture, database design, program design, user interface design and the expected outcome.

System design is an integral part of developing any piece of application or software, and of course the PELITAWANIS TNB Portal is no exception. The elicited requirements from the literature review and fact-finding techniques are translated into the system characteristics to fulfill the user and the system requirements. This process is a structured yet creative one, involving the transformation of problems into a solution that includes a complete description of the functions and interactions involved. Even though the system design only describes the appearance and functionality of the proposed system, it is the key factor in determining the level of success and acceptance of the overall project.

Fundamentally, designing a system refers to the process of identifying a set of components and inter-components that satisfies a specified set of requirements. There are various ways to design a system, and the choice of which approach to use depends on the preference and experience of the developer. System design usually involves some kind of decomposition, a process that starts at the high-level depiction of the system's key elements and then creating lower level representations on how the system's features and functions will fit together.

The process of designing a particular system is an iterative one, with the developer moving back and forth between activities such as understanding the requirements, proposing possible solutions, testing aspects of a solution for feasibility, presenting possibilities to the users, and documenting the design. Therefore, the chosen development model (waterfall with prototyping) is well suited to the proposed system because of the nature of the design process, which requires the developer to proceed step-by-step, but with reviews and checks done regularly via prototyping.

5.1 SYSTEM ARCHITECTURE

The choice of system architecture will affect all aspects of software design and engineering of a development project. Any inappropriate or flawed architectural design could result in an increase of development cost, poor response time, intricate future flexibility and thorny maintenance of the application (Gallaugher, 1995).

The PELITAWANIS TNB Portal architecture is developed based on the client/server approach. The client/server architecture is defined as a computational architecture that involves client processes requesting service from server processes (Client/Server..., 1998). Servers are powerful computers or processes dedicated to managing disk drives (file servers), printers (print servers), or network traffic (network servers). Clients are personal computers or workstations on which users run applications. Clients rely on servers for resources, such as files, devices, and even processing power.

5.1.1 The Three-tier Client/Server Architecture

The author has chosen to adopt the three-tier client/server architecture. This type of architecture introduces an additional server or agent between the client and the server. The role of agent is diverse, ranging from translation services as in adapting a legacy application on a mainframe to a client/server environment, metering services as in acting as a transaction monitor to limit the number of simultaneous requests to a given server, to intelligent agent services as in mapping a request to a number of different servers, collating the results, and returning a single response to the client (Client/Server..., 1998).

This architecture comprises three well-defined layers with each performing distinct processes:

(a) The first tier is the Client. The Internet browser provides the user interface to obtain inputs from users and to display outputs.

(b) The middle tier runs on a server and is often called the Application Server. This is where the functional modules actually process the data.

(c) The third tier runs on a second server called the Database Server. A database management system (DBMS) resides in the server and stores the data required by the middle tier.

5.1.2 Advantages of Three-tier Client/Server Architecture

A two-tier architecture is where a client talks directly to a server, with no intervening server. This is typically used in small environments with less than 50 concurrent users. The approach of prototyping an application in the two-tier environment, and then scaling

it up by simply adding more users to the server will usually result in an ineffective system. In order to avoid the servers from being overwhelmed and to properly scale to hundreds or thousands of users, the three-tier architecture needs to be implemented.

The three-tier architecture has many advantages over traditional two-tier or single tier designs. The main advantages includes the following:

(a) Added modularity makes it easier to modify or replace one tier without affecting the other tiers;

(b) Separating the application functions from the database functions makes it easier to implement load balancing;

(c) Increases performance and security for large number of users; and

(d) Improves openness, flexibility, maintainability, reusability, and scalability while hiding the complexity of distributed processing from the user.

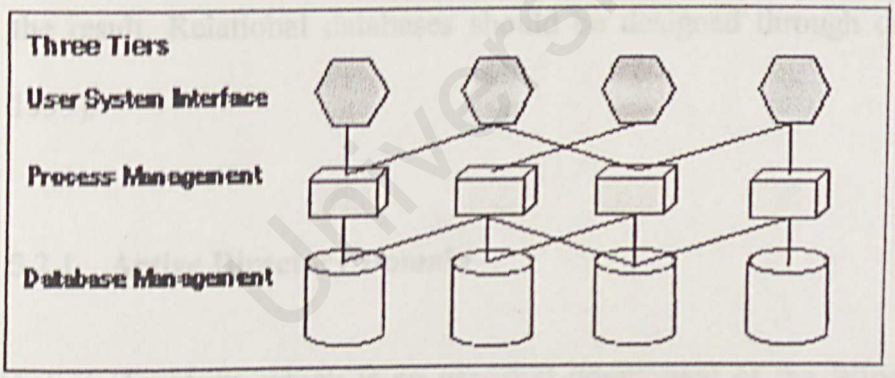


Figure 5.1: The Three-Tier Client/Server Architecture

5.2 DATABASE DESIGN

Database is a crucial component of the information portal, and it is essential to design a database carefully to ensure its functionality and maintainability. Some of the key aspects of data storage are:

(a) Data availability – ensure data is available when needed

(b) Data integrity – ensure accuracy and consistency of data

(c) Efficient data storage

(d) Efficient data updating and retrieval

(e) Purposeful data retrieval – information retrieved must be in a useful form to assist users

The heart of any database is the Database Management System (DBMS), which allows data creation, modification, retrieval, and generation of reports. The implemented database is based on the relational database approach. A relational database stores all its data in tables. All operations on data are done on the tables or produce another table as the result. Relational databases should be designed through data normalization (Post, 1999).

5.2.1 Active Directory Domain

Active Directory, which is an essential component of the Windows 2000 architecture, presents organizations with a directory service designed for distributed computing environments. Active Directory allows organizations to centrally manage and share information on network resources and users while acting as the central authority for network security. In addition to providing comprehensive directory services to a

Windows environment, Active Directory is designed to be a consolidation point for isolating, migrating, centrally managing, and reducing the number of directories that companies require (Active Directory, 2001).

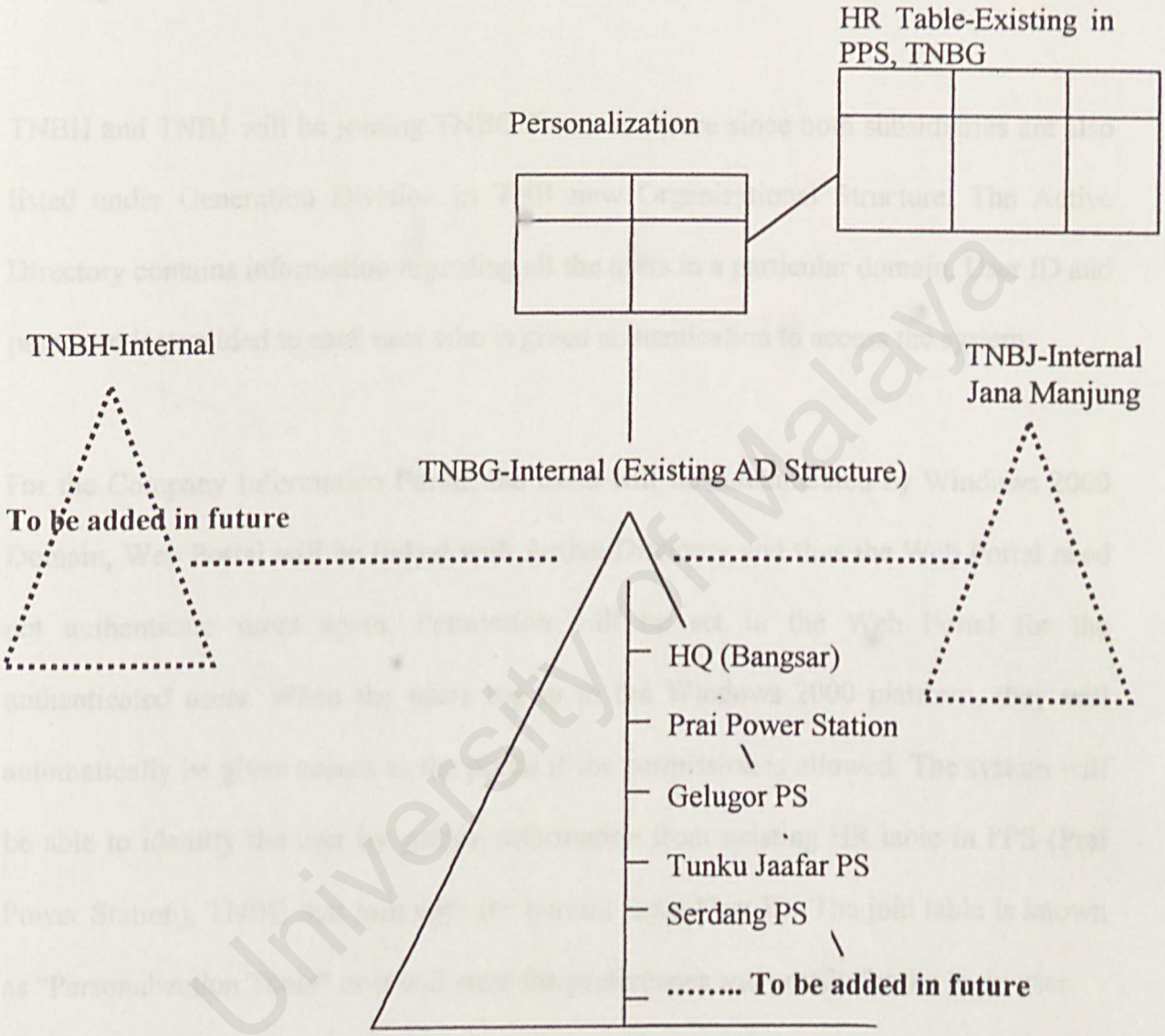


Figure 5.2: Active Directory Domain for TNBG and its related domains

The diagram above depicts the relationship between the Active Directory domains for TNBG in Peninsular Malaysia. The main domain for the proposed project is the TNBG-Internal domain.

The power stations currently joining this domain are the Headquarters (Bangsar), Prai Power Station, Gelugor Power Station, Tunku Jaafar Power Station (Port Dickson), Serdang Power Station. Other power stations will be joining this Domain in future.

TNBH and TNBJ will be joining TNBG Forest in future since both subsidiaries are also listed under Generation Division in TNB new Organizational Structure. The Active Directory contains information regarding all the users in a particular domain. User ID and password is provided to each user who is given authentication to access the system.

For the Company Information Portal, the users will be authenticated by Windows 2000 Domain, Web Portal will be linked with Active Directory and thus the Web Portal need not authenticate users again. Permission will be set in the Web Portal for the authenticated users. When the users log in to the Windows 2000 platform, they will automatically be given access to the portal if the permission is allowed. The system will be able to identify the user by getting information from existing HR table in PPS (Prai Power Station), TNBG that join with the current login User ID. The join table is known as "Personalization Table" as it will store the preferences and profile for the login user.

5.2.2 Entity-Relationship Diagram

An entity-relationship diagram is a data modeling technique that creates a graphical representation of the entities, and the relationships between entities, within an

information system. It also defines the proper system boundaries and shows the relationship between the inter-connected tables in the database.

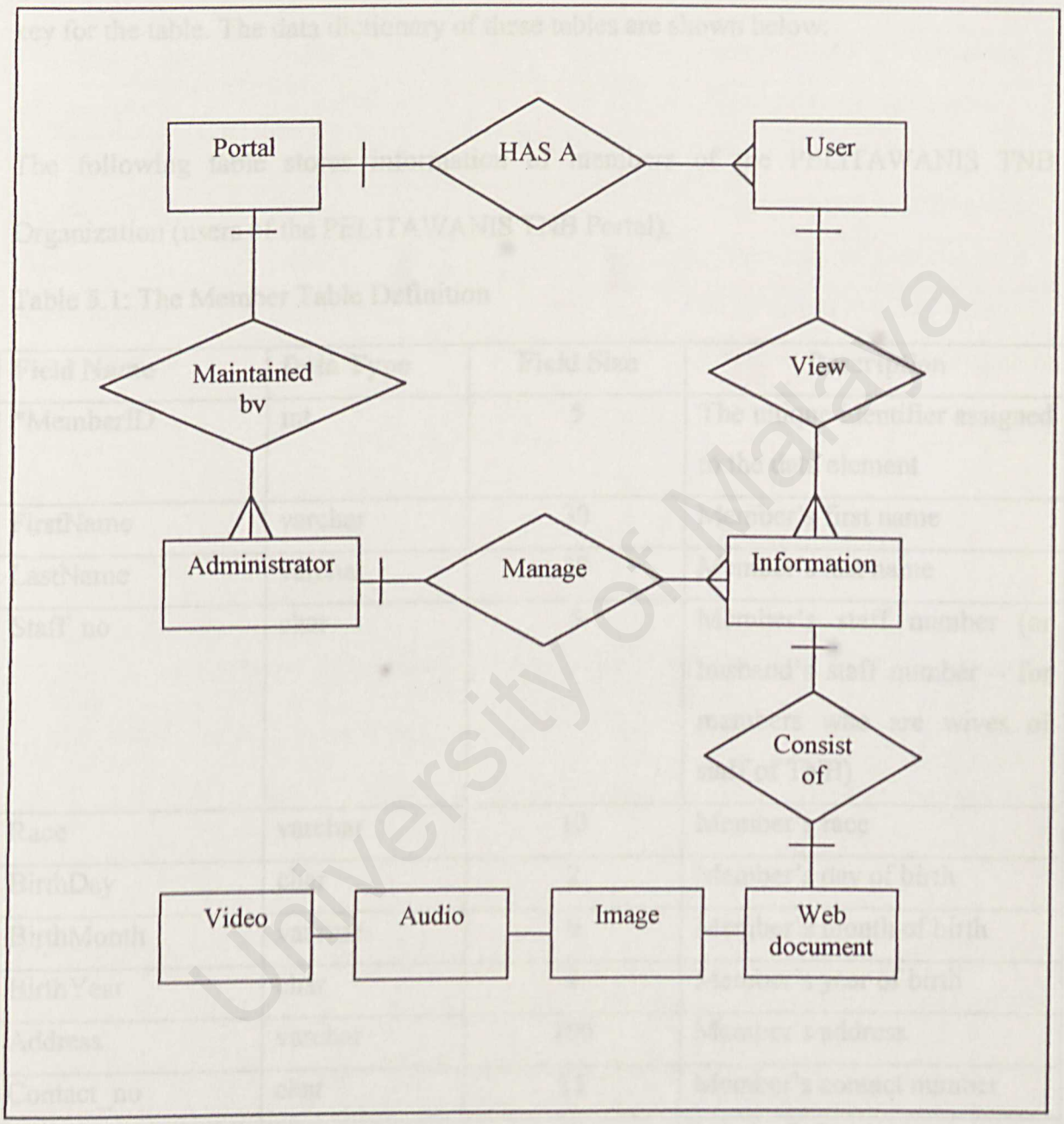


Figure 5.3: The Entity-Relationship Diagram of the Proposed PELITAWANIS TNB Portal

5.2.3 Data Dictionary

The database of the PELITAWANIS TNB Portal consists of two main tables, namely the MemberList Table and the Administrator Table. The '*' symbol indicates the primary key for the table. The data dictionary of these tables are shown below:

The following table stores information of members of the PELITAWANIS TNB Organization (users of the PELITAWANIS TNB Portal).

Table 5.1: The Member Table Definition

Field Name	Data Type	Field Size	Description
*MemberID	int	5	The unique identifier assigned to the data element
FirstName	varchar	30	Member's first name
LastName	varchar	30	Member's last name
Staff_no	char	5	Member's staff number (or husband's staff number – for members who are wives of staff of TNB)
Race	varchar	10	Member's race
BirthDay	char	2	Member's day of birth
BirthMonth	varchar	9	Member's month of birth
BirthYear	char	4	Member's year of birth
Address	varchar	100	Member's address
Contact_no	char	11	Member's contact number
LastLogin	datetime	8	Member's last login
Email	varchar	25	Member's e-mail address
Password	varchar	16	Member's password

The following table stores information of system administrators.

Table 5.2: The Administrator Table Definition

Field Name	Data Type	Field Size	Description
*A_ID	int	5	The unique identifier assigned to the data element
A_login	varchar	15	Administrator's login name
A_password	varchar	15	Administrator's password
A_name	varchar	30	Administrator's name
A_staffno	char	5	Administrator's staff number
Status	char	1	Administrator's access level
Last_logged	datetime	8	Administrator's last login
Last_updated	datetime	8	Date and time information updated

5.3 PROGRAM DESIGN

Program design requires the author to visualize the system data flow by means of understanding the information requirement of users. The author uses the conceptual freedom afforded by structure charts and data flow diagrams to illustrate the data flow.

5.3.1 Structure Chart

The structure chart is a type of tree diagram that depicts the main modules of the PELITAWANIS TNB Portal. These modules are factored into more detailed sub-modules using the top-down approach. The project's structure chart is derived from the comprehensive and analytical study of how the system modules flow.

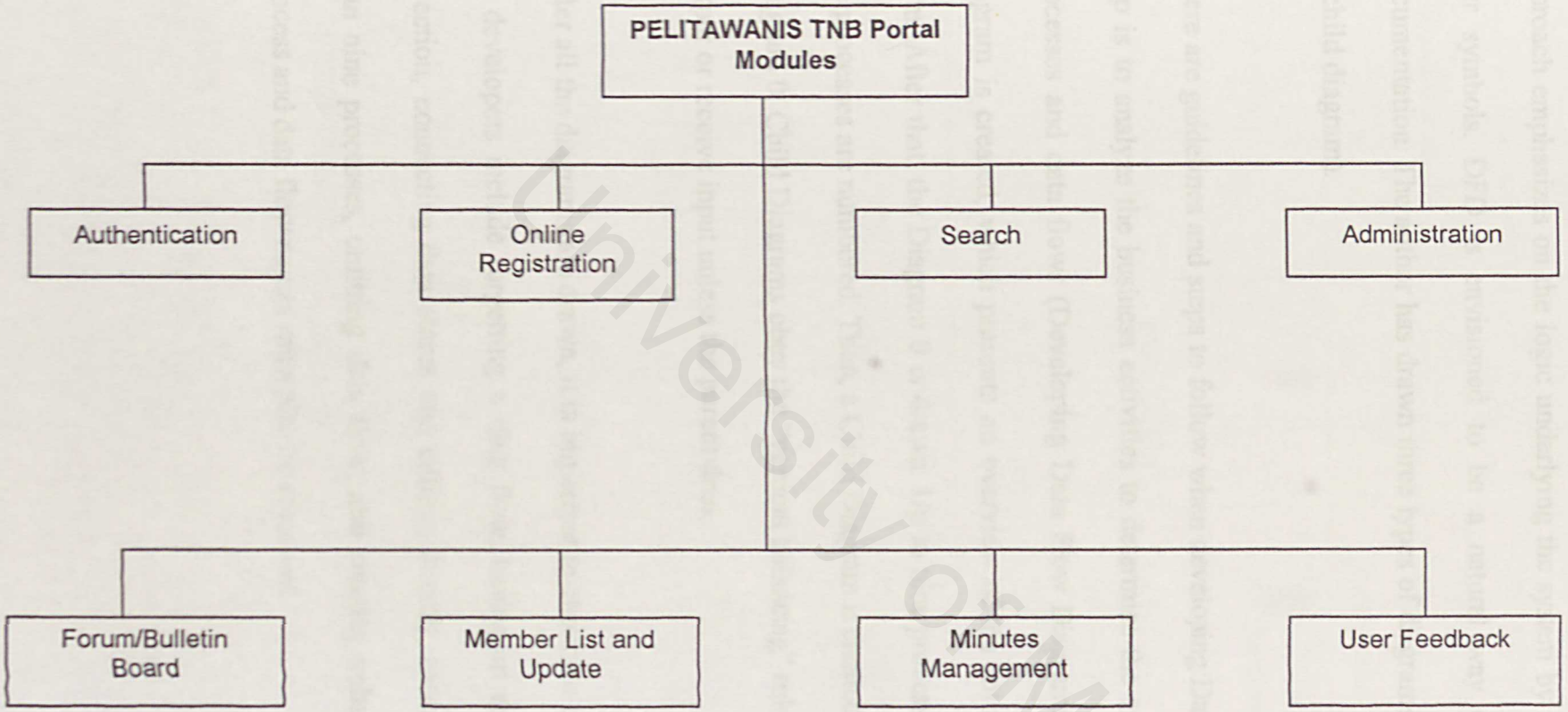


Figure 5.4: Structure Chart for the PELITAWANIS TNB Portal

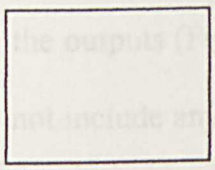
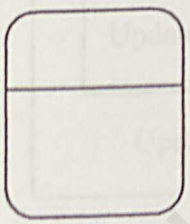
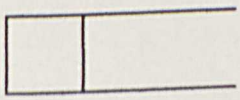
5.3.2 Data Flow Diagram

Data Flow Diagram (DFD) is a graphical representation of a system that illustrates the data flows through interconnected processes (Kendall & Kendall, 1999). The DFD approach emphasizes on the logic underlying the system by using combinations of only four symbols. DFD is envisioned to be a natural way of providing solid system documentation. The author has drawn three types of diagrams (context diagram, diagram 0, child diagram).

There are guidelines and steps to follow when developing Data Flow Diagrams. The first step is to analyze the business activities to determine the external entities, data flows, processes and data flows (Developing Data Flow Diagrams, 2002). Next, the context diagram is created, which presents an overview of the entire system in its most basic form. After that, the Diagram 0 is drawn. Up to nine processes may be shown here, and the processes are numbered. Then, a Child Diagram is created for each of the processes in Diagram 0. Child Diagrams obey the "vertical balancing" rule – that is, it cannot produce output or receive input unless the parent does.

After all the diagrams are drawn, it is important to check for errors. Common errors made by developers include forgetting a data flow, having an arrow pointing in the wrong direction, connecting data stores and entities directly, incorrect labeling, having more than nine processes, omitting data flow, and creating unbalanced decomposition. The process and data flow names must also be reviewed.

Table 5.3: The Descriptions of the Conventions Used in Data Flow Diagrams

Symbols	Meaning	Description
	Entity	• Used to depict an external entity that can send data to or receive data from the system. • Also known as source or destination of data and considered beyond the boundaries of the system.
	Flow of data	• Used to represent the flow of data or information from one point to another. • Arrow describes the directions of the flow, with the arrowhead pointing to the data's destination. • Each data flow is labeled with the details of the data.
	Process	• Used to show occurrences of a transforming process. Processes always denote a change in data within the system. • The symbol consists of two sections: (a) The top section is the unique identifier indicating its level, and (b) The lower section contains the description of the process.
	Data Store	• Used to represent data store and holds data for a given time within the system. • The symbol consists of two sections: (a) Identifier reference number, and (b) Description of the data stored.

(a) Context Diagram

A context diagram is a straightforward representation of the entire system in a very common state. It is an overview, which includes basic inputs, the general system, and the outputs (Figure 5.4). It consists of a single process that is numbered '0' and does not include any data stores.

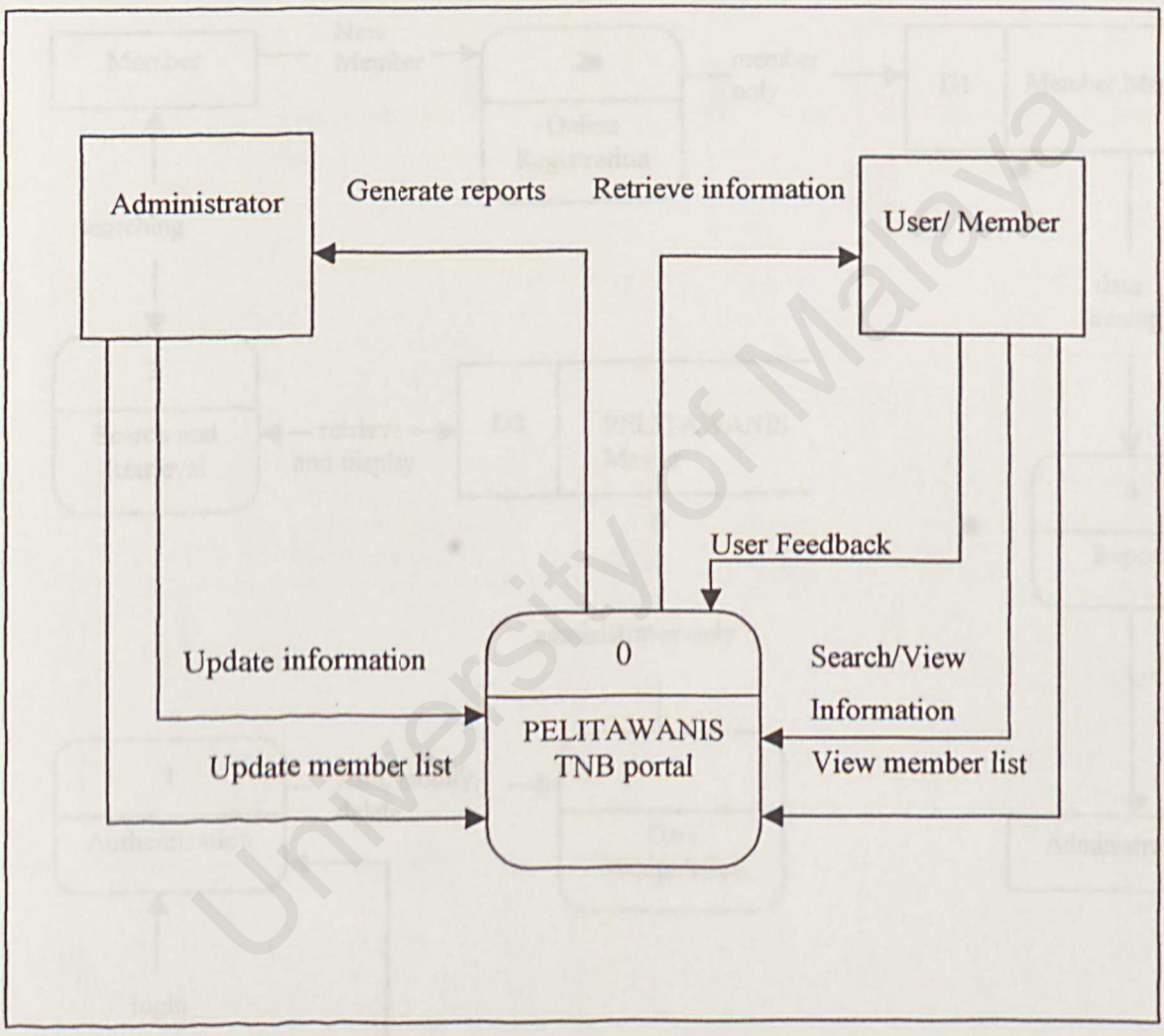


Figure 5.5: The Context Diagram for the PELITAWANIS TNB Portal

(b) Diagram 0

Diagram 0 is the detailed description or explosion of the context diagram. It shows all the major processes, data movement and data stores at the highest level of detail. Figure 5.6 illustrates the Diagram 0 of the proposed PELITAWANIS TNB Portal.

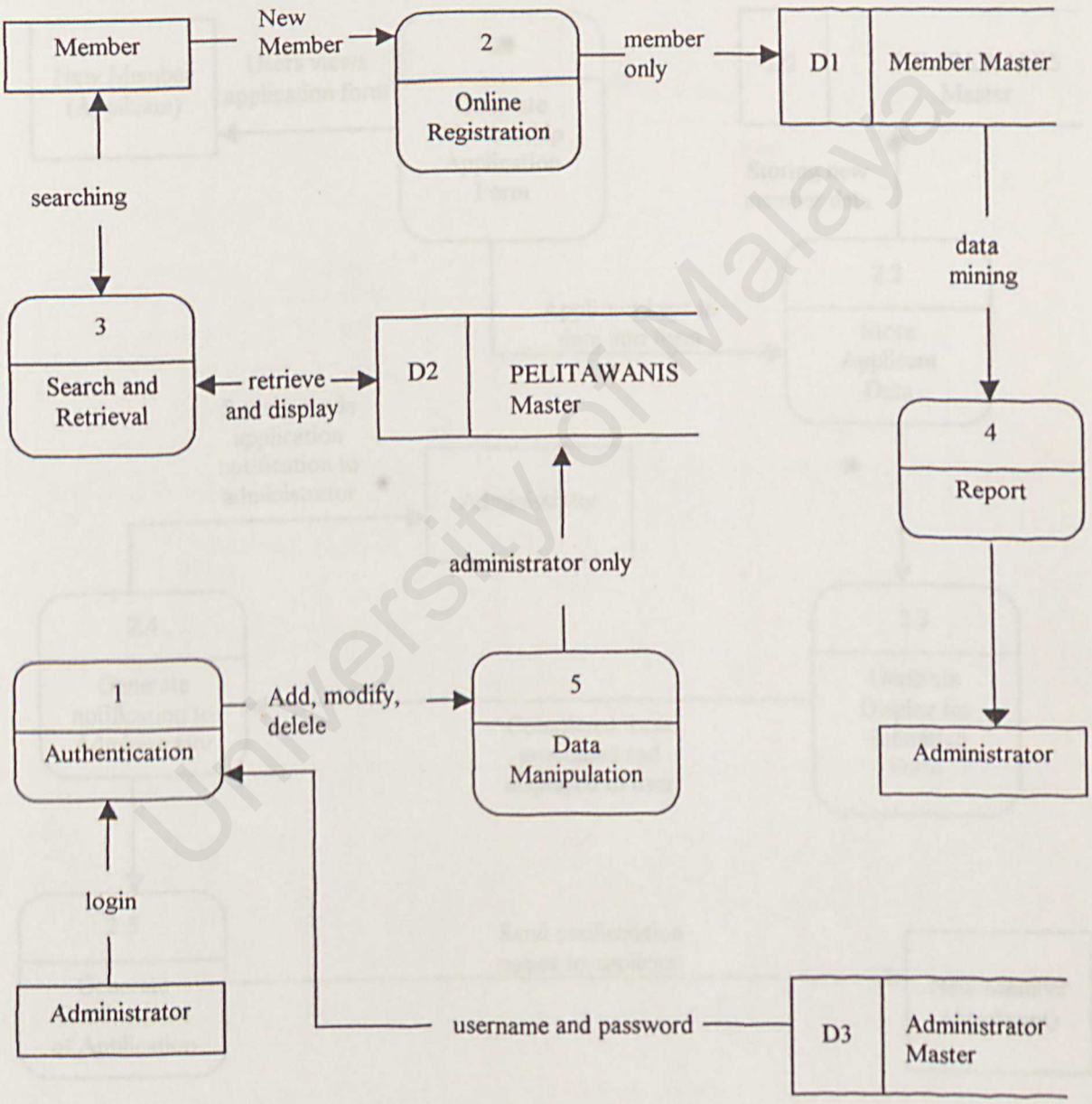


Figure 5.6: The Diagram 0 of the Proposed PELITAWANIS TNB Portal

(c) Child Diagram

A Child Diagram is a further detailed representation of sub-processes originating from the higher level of processes in Diagram 0. Figure 5.7 and Figure 5.8 illustrates the Child Diagrams for the online registration, and the search function in the proposed PELITAWANIS TNB Portal.

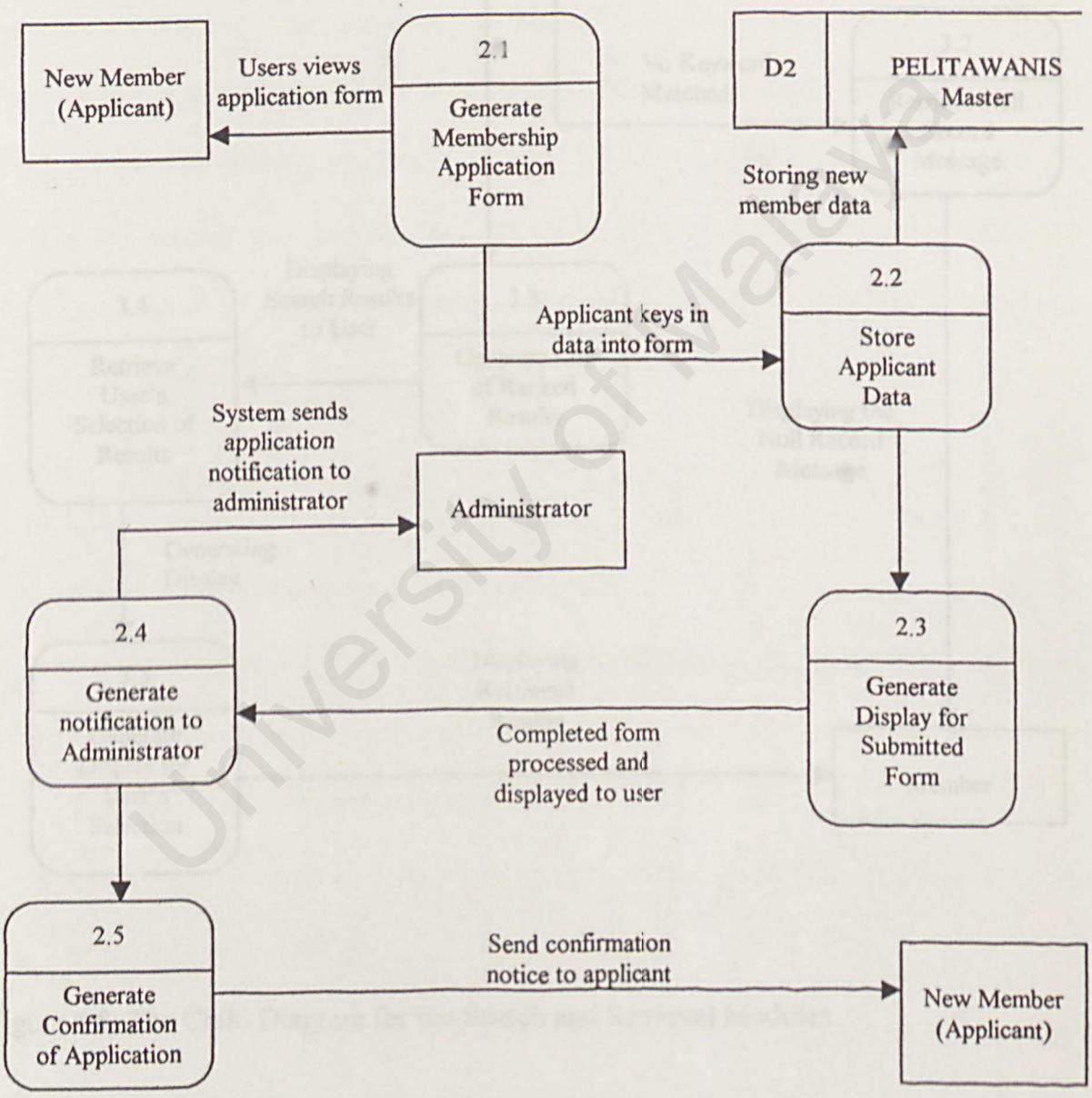


Figure 5.7: The Child Diagram of the Online Registration Function

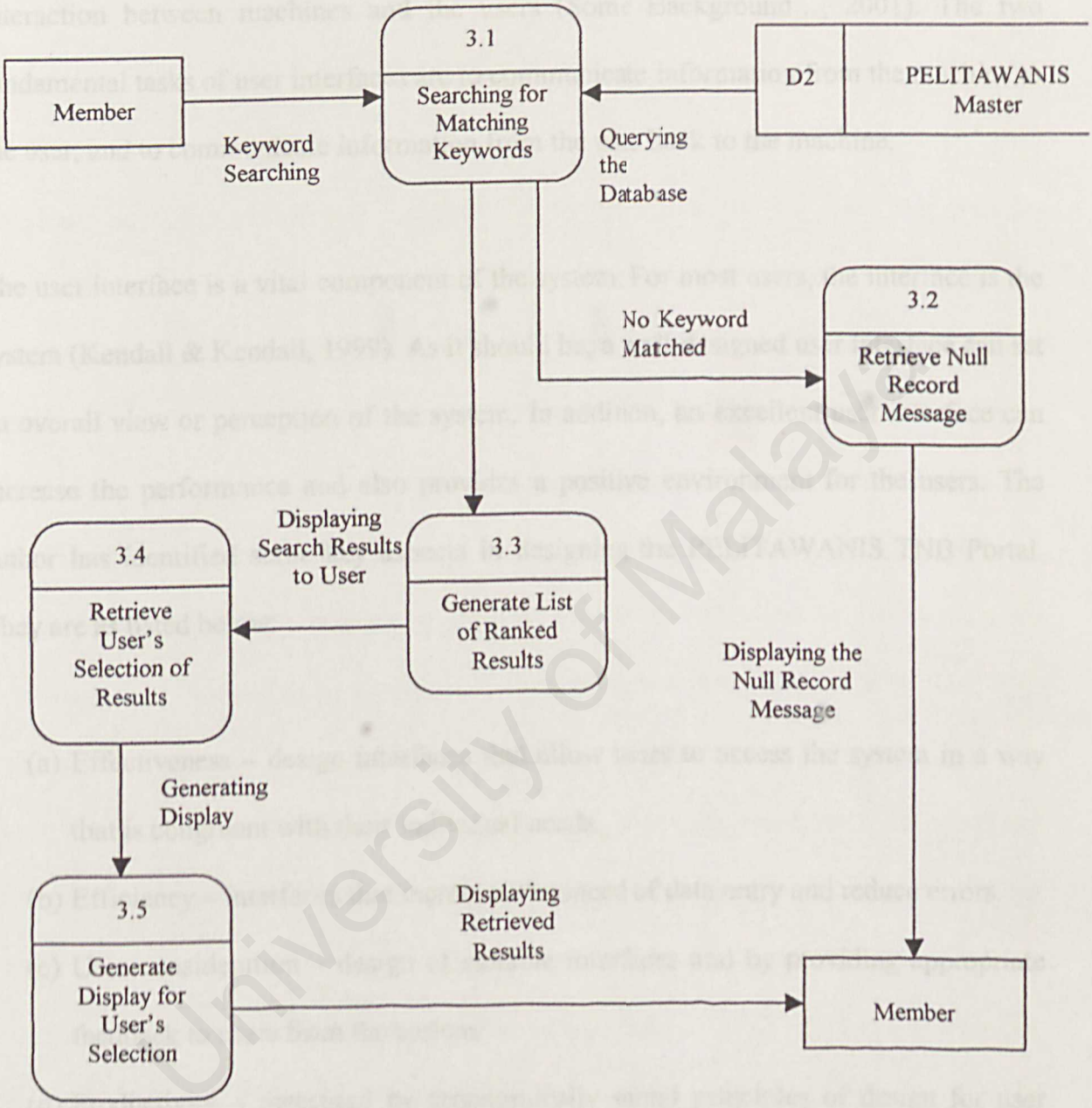


Figure 5.8: The Child Diagram for the Search and Retrieval Modules

5.4 USER INTERFACE DESIGN

User interface is defined as methods and devices that are used to accommodate interaction between machines and the users (Some Background..., 2001). The two fundamental tasks of user interfaces are to communicate information from the machine to the user, and to communicate information from the user back to the machine.

The user interface is a vital component of the system. For most users, the interface is the system (Kendall & Kendall, 1999). As it should be, a well-designed user interface can set an overall view or perception of the system. In addition, an excellent user interface can increase the performance and also provides a positive environment for the users. The author has identified some key aspects in designing the PELITAWANIS TNB Portal. They are as listed below:

(a) Effectiveness – design interfaces that allow users to access the system in a way that is congruent with their individual needs.

(b) Efficiency – interfaces that increases the speed of data entry and reduce errors.

(c) User consideration – design of suitable interfaces and by providing appropriate feedback to users from the system.

(d) Productivity – measured by ergonomically sound principles of design for user interfaces and workspaces.

The author has also applied the Fitts' Law in the PELITAWANIS TNB Portal user interface. Fitts' Law is one of the models and theories of Human-Computer Interactions

(HCI). It states that the time to acquire a target is a function of the proximity and size of the target (Fitts' Law..., 2001). The user interface is designed with two main components: presentation language, which is the computer-to-human part of the transaction, and action language, which characterizes the human-to-computer portion.

There are several types of user interface. Some are text-based and some are graphic-based. The author has chosen to implement the Graphical User Interface (GUI) for the PELITAWANIS TNB Portal. Computer researchers at the Palo Alto Research Center first developed the GUI. There are two main reasons for choosing this type of interface. Firstly, communication of information to users using graphics is much more effective and user-friendly as compared to using text alone. The other reason is, by using GUI, the author can present a finite number of options to the users rather than requiring the users to memorize or manually enter commands from a virtually limitless set of options. This will help the system to focus on meeting the needs of the users, and the users will be able to use the system with ease. This will significantly reduce the necessary training needed to familiarize users with the system, and uninitiated users are able to make use of the system almost immediately. GUI allows direct manipulation of the graphical representation on the screen, which can be accomplished with keyboard input or a mouse. However, this type of direct manipulation requires more system sophistication. Figure 5.8 illustrates some of the proposed user interface designs of the PELITAWANIS TNB Portal.

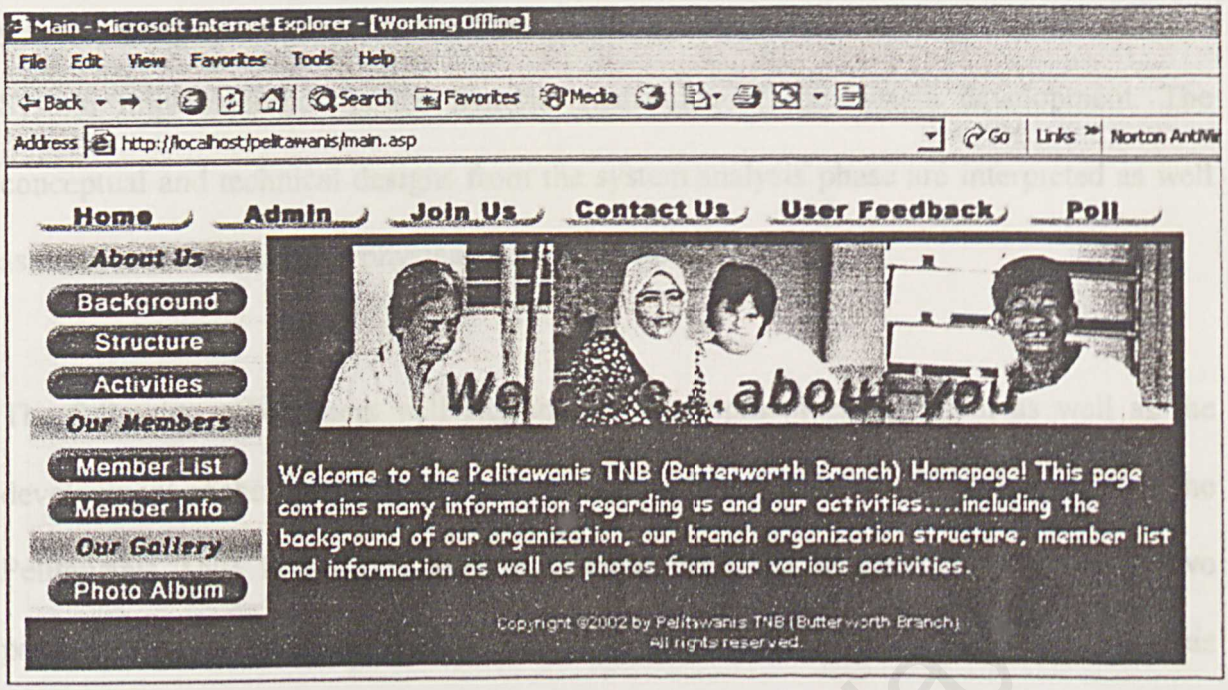


Figure 5.9: The User Interface Draft

5.5 EXPECTED OUTCOME

The author's key target is to realize the project goals and objectives. The end product of this project is the dedicated PELITAWANIS TNB Portal. This project is focused to meet the needs of the PELITAWANIS TNB Organization members and the management of TNB.

CHAPTER 6: SYSTEM IMPLEMENTATION

System implementation is the material realization of the system development. The conceptual and technical designs from the system analysis phase are interpreted as well as modeled to become the physical working system itself.

The following subchapters will explain the development environment as well as the development of the system itself, some system coding and the coding style applied in the Pelitawanis TNB Portal. The physical development environment is divided into two parts, the hardware and software components. As for the development of the Pelitawanis TNB Portal, it consists of two individual components, namely the database development and the prototype development. The system coding is described according to modules. The final subchapter highlights some of the good programming practices applied throughout the Pelitawanis TNB Portal system development.

6.1 DEVELOPMENT ENVIRONMENT

Development environment has a momentous influence on the development of a system. System development can be paced up significantly by utilizing the appropriate hardware and software. The following sections discuss the hardware and software tools used to develop and document the Pelitawanis TNB Portal System.

6.1.1 Hardware in the Development Environment

The hardware configured for the development environment is the element of the whole system. The hardware used in the system implementation phase plays an important role in realizing the final system architecture.

The hardware configuration of the development environment is listed as follows:

(a) Processor – At least Intel Pentium III (733 MHz)

(b) Memory – At least 128MB RAM

(c) Hard Disk Space – Available 10.0GB

(d) Other standard PC compliant requirements

For SharePoint Portal Server, the requirements are as follows:

(a) At least Intel Pentium III

(b) At least 256MB RAM / 512MB RAM when server is used exclusively for searching

(c) Available 160MB of hard disk space on which Operating System is installed

(d) At least 60MB of available disk space on the drive on which the program files are installed

6.1.2 Software in the Development Environment

Hardware and software form a tightly coupled cohesion that operates in unison to perform programmed tasks. Without software, the fastest, biggest or the most powerful computer will also be inoperative and useless.

The software tools utilized in the development environment are listed as follows:

(a) Operating System – Microsoft Windows 2000 Server SP2 (Microsoft Windows 2000 2.00.2195 Service Pack 2)

(b) Web Server – Microsoft Internet Information Service (IIS) 5.0

(c) Database Management System – Microsoft SQL Server 2000

(d) Web Development Tool – Macromedia Dreamweaver MX

(e) Coding Languages:

User Interface – Hypertext Markup Language (HTML), Cascaded Style Sheet (CSS)

Server Side Scripting – Active Server Pages (ASP), Visual Basic Scripts (VBScript)

Client Side Scripting – JavaScript

(f) Graphics Creation – Macromedia Flash MX, Adobe Photoshop 6.0

(g) Web Browser – Microsoft Internet Explorer 6.0

(h) Documentation – Microsoft Word 2000

Table 6.1: Summary of the Prototype Development Tools

Software	Usage	Description
Microsoft Windows 2000 Server	System Development Environment Platform	Operating System
Microsoft SharePoint Portal Server	System Development	Main development platform
Macromedia Dreamweaver MX	System Development	Prototype cascaded style sheet coding, prototype module coding and interface designs

Microsoft Internet Information System 5.0	Web Server Platform	Executing server side scripts and Active Server Pages
Adobe Photoshop 6.0	Interface and Visualization Designs	Designing interface graphical images and icons, editing photos
Microsoft Internet Explorer 6.0	Previewing and Evaluating Prototype	Executing client side scripts and Hypertext Markup Language coding

6.2 DEVELOPMENT OF THE SYSTEM

6.2.1 Database Development

The system database is created in Microsoft SQL Server 2000, which is the Database Management System (DBMS). Many of the administrative tasks performed with SQL Server are accomplished using the Enterprise Manager. This tool is used to create the system database and all of the associated objects such as tables, views, diagrams and others. Maintenance tasks, which consist of backing up and restoring the database, are also done using the Enterprise Manager.

The Enterprise Manager tool is used to create the system database named pelitawanis. All the tables in the database are created by specifying all the fields for each table and the field's property. Relationships between the tables are established after the tables are created to enforce referential integrity. Referential integrity is an important constraint on a relationship that ensures consistency between related tables. Figure 6.1 displays the pelitawanis database tables in Enterprise Manager (shown on the next page).

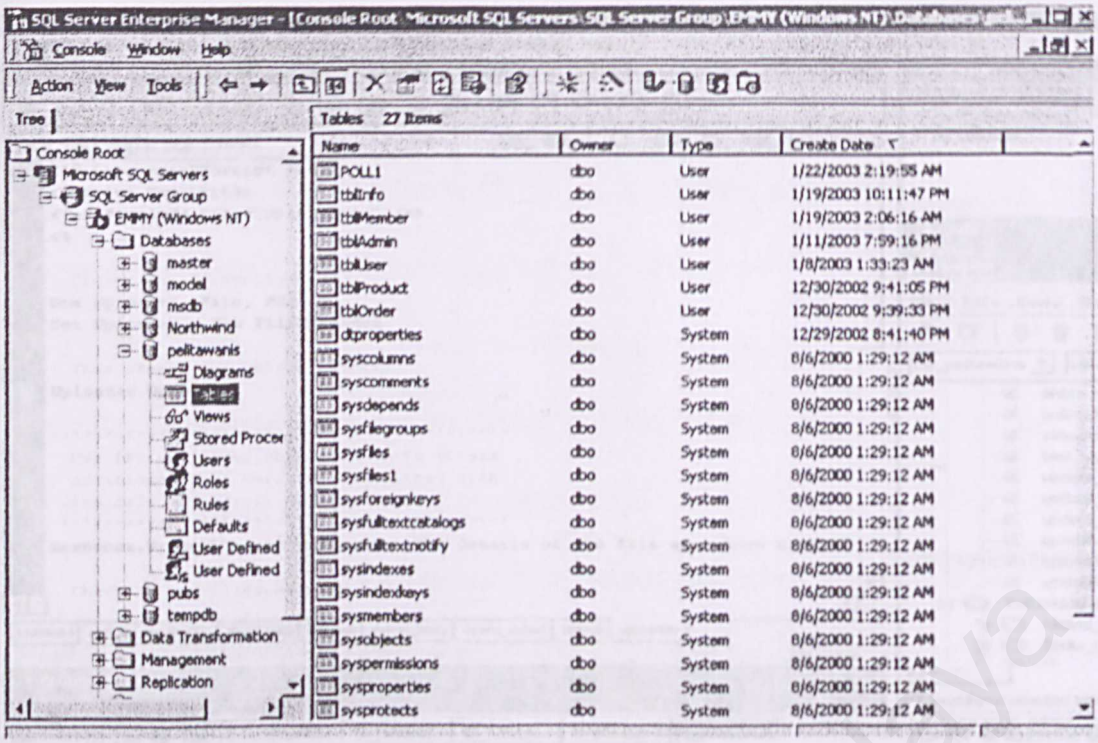


Figure 6.1: The Pelitawanis Database Tables Displayed in Enterprise Manager

6.2.2 Prototype Development

The prototype development is the construction of the system utilizing the necessary means to achieve the proposed specification. The Pelitawanis TNB Portal mainly consists of Active Server Pages (ASP). ASP has become the established way to build dynamic Web pages and Web-based applications on a Windows server platform. Figure 6.2 depicts the Code View of Macromedia Dreamweaver MX (refer to the next page).

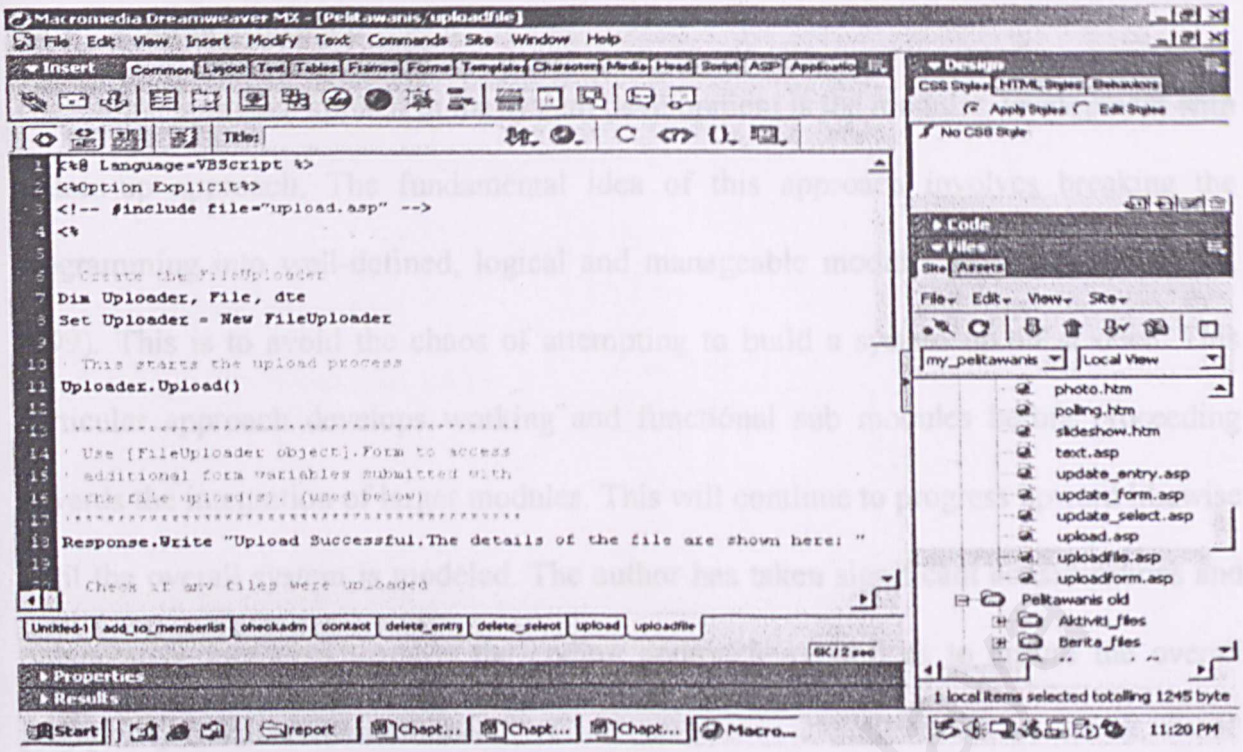


Figure 6.2: The Macromedia Dreamweaver MX Development Environment

6.3 SYSTEM CODING

System coding is referred as converting the prior system design into a working and functional system. This mainly comprises of software programming and preliminary testing of the prototype model. Programming is the process of transforming the structure charts, logical and physical data flow diagrams as well as interface designs into a working prototype model. During this transformation, both processing and testing should occur in parallel (Jessup & Valacich, 1999). The testing performed in this phase is the developmental testing. The programmer or the author of this report is responsible for carrying out this preliminary testing that focuses on the correctness of individual modules and the integration of multiple modules of the prototype model.

6.3.1 Coding approach

The coding approach applied in the system development is the modular development with bottom-up approach. The fundamental idea of this approach involves breaking the programming into well-defined, logical and manageable modules (Kendall & Kendall, 1999). This is to avoid the chaos of attempting to build a system up all at once. This particular approach develops working and functional sub modules before proceeding towards the integration of larger modules. This will continue to progress upward likewise until the overall system is modeled. The author has taken significant considerations and preventative measures towards the coding approach as well as to ensure the overall project objectives are best attained.

6.3.2 Administration Module Coding

The Administration module is used by the system administrators to login into the administration menu to perform the updating, addition and deletion of information from the portal. The administrators have access to the member list as well as other information found on the portal. Table 6.2 lists the files for the Administration module. Figure 6.3 depicts a sample coding for the Administration Module (please refer to the next page).

Table 6.2: The List of Files Created for the Administration Module

add_admin.asp	newloginadm.asp
admin_formnew.asp	logout_adm.asp
changepw.asp	pw_change.asp
confirm.asp	session.asp
error.asp	valid.asp
new_admin.asp	validation.asp

```
<!--#INCLUDE FILE ="includes/connection1.asp"-->

<%
FUNCTION fixQuotes (theString)
        fixQuotes = REPLACE (theString, "'", "''" )
END FUNCTION

FUNCTION encryptPwd(pass)
        lengthPass = Len(pass)
        FOR i = 1 to lengthPass
                tkn = Mid(pass, i, 1)
                encryptPwd = encryptPwd + Chr(Asc(tkn)+122)
        NEXT
END FUNCTION

UserID = Request.Form("UserID")
password= Request.Form("Password")
enpw= encryptPwd(Password)

'pass back to previous page
lastPath = Request.ServerVariables("HTTP_REFERER")

'check for empty loginID or password
IF UserID = "" OR Password = "" THEN
        Response.Redirect
"error.asp?path="+Server.URLEncode(lastPath)+"&err="+Server.URLEncode("Invalid Login ID
or Password! Contact System Administrator If You See This Error Page Again.")
END IF

'check for different levels
strSql = "SELECT * FROM tblAdmin WHERE UserID='"+UserID+"' AND Password='"+
fixQuotes (enpw) +"' "

Set rsValid = objConn.Execute(strSql)
IF rsValid.EOF THEN
        'user does not exist
        Response.Redirect
"error.asp?path="+Server.URLEncode(lastPath)+"&err="+Server.URLEncode("Invalid User ID
Or Password!")
ELSE
        'user exist
%>
<!-- #INCLUDE FILE="session.asp" -->
<%
        Response.Redirect "newdestination_adm.asp"
END IF
%>
```

Figure 6.3: The Coding for valid.asp in the Administration Module

6.3.3 Member List and Update Module Coding

The Member List and Update module is the module that allows the manipulation of member data in the Pelitawanis TNB Portal. Table 6.3 lists the files created by the author for the Member List and Update module.

Table 6.3: The List of Files Created for the Member List and Update Module

add_to_memberlist.asp	memberform.asp
confirm.asp	memberlist.asp
delete_entry.asp	newdestination_adm.asp
delete_form.asp	update_entry.asp
delete_select.asp	update_form.asp
error.asp	update_select.asp

Figure 6.4 depicts a sample coding for the Member List and Update Module.

```
<!--#INCLUDE file="includes/connection1.asp"-->

<HTML>
<HEAD>
<link rel="stylesheet" href="index.css">
</HEAD>
<BODY>
<%
'Option Explicit
'Dimension variables

Dim rsMemberList     'Holds the recordset for the records in the database
Dim strSQL           'Holds the SQL query to query the database

'Create an ADO recordset object
Set rsMemberList = Server.CreateObject("ADODB.Recordset")

'remember to write code to display member type also!
'Initialise the strSQL variable with an SQL statement to query the database with
strSQL = "SELECT * FROM tblMember;"

'Open the recordset with the SQL query
rsMemberList.Open strSQL, objConn

%>
```

```
<p class="maintext" align="center">Below is the list of registered members as of the last update.</p>
<table border="1" align="center">
<tr>
        <td class="admin">No Pekerja   </td>
        <td class="admin">Membership   </td>
        <td class="admin">Name   </td>
</tr>
<%
'Loop through the recordset
Do While not rsMemberList.EOF
        'Write the HTML to display the contents of the recordset
%>
<tr>
        <td class="admintxt"><% Response.Write (rsMemberList("NoPekerja")) %></td>
        <td class="admintxt"><% Response.Write (rsMemberList("MemberType")) %></td>
        <td class="admintxt"><% Response.Write (rsMemberList("Title")) & " " %>
                <% Response.Write (rsMemberList("FirstName")) & " " %>
                <% Response.Write (rsMemberList("LastName")) & " " %>
        </td>
</tr>
<%
        'Move to the next record in the recordset
        rsMemberList.MoveNext

Loop

'Reset server variables
rsMemberList.Close
Set rsMemberList = Nothing
Set objConn = Nothing
%>

</table>
<br>
<br>
<center><a href="destination_adm.asp" class="admin">Back to administrator page</a></center>

</BODY>
</HTML>
```

Figure 6.4: The Coding for memberlist.asp in the Member List and Update Module

6.3.4 User Feedback Module Coding

The User Feedback module is the module that allows users to give their comments regarding the portal and also view what other users have to say about it. Table 6.4 lists the files created by the author for the User Feedback module and Figure 6.5 shows a sample coding for the User Feedback Module.

Table 6.4: The List of Files Created for the User Feedback Module

add_feedback.asp	userfeedback.asp userfeedbacklist.asp

```
<!--#INCLUDE file="includes/connection1.asp"-->
<%
Dim rsAddFeedback     'Holds the recordset for the records in the database
Dim strSQL            'Holds the SQL query to query the database

'Create an ADO recordset object
Set rsAddFeedback = Server.CreateObject("ADODB.Recordset")
'Initialise the strSQL variable with an SQL statement to query the database with
strSQL = "SELECT * FROM tblUser;"

'Open the recordset with the SQL query
rsAddFeedback.Open strSQL, objConn, 3, 2

'Tell the recordset we are adding a new record to it
rsAddFeedback.AddNew

'Add a new record to the recordset
rsAddFeedback.Fields("Name") = Request.Form("name")
rsAddFeedback.Fields("Email") = Request.Form("email")
rsAddFeedback.Fields("Comments") = Request.Form("comments")

'Write the updated recordset to the database
rsAddFeedback.Update
'Reset server variables
rsAddFeedback.Close
Set rsAddFeedback = Nothing
Set objConn = Nothing
Response.Redirect "feedbacklist.asp"
%>
```

Figure 6.5: The Coding for add_feedback.asp in the User Feedback Module

6.3.5 Edit Information Module

The Edit Information Module handles all the updating or editing of information found on the portal. Administrators can put up the latest information regarding the portal so that the portal will always be kept up-to-date. Table 6.5 shows the list of files created for the Edit Information module while Figure 6.6 shows the sample coding for the module.

Table 6.5: The List of Files Created for the Edit Information Module

confirm.asp	editmbri.asp
editactv.asp	editmbrl.asp
editbackgrd.asp	editorgchart.asp
editcontact.asp	editphoto.asp
editinfo.asp	edituserfbk.asp
editjoin.asp	error.asp
editmain.asp	updateinfo_entry.asp
	updateinfo_form.asp

```
<!--#INCLUDE file="includes/connection1.asp"-->
<%
'Dimension variables
Dim rsUpdateEntry     'Holds the recordset for the records in the database
Dim strSQL            'Holds the SQL query to query the database
'Dim lngRecordNo      'Holds the record number to be updated

'Read in the record number to be updated
'lngRecordNo = CLng(Request.QueryString("ID"))
InfoID = Request.Form("InfoID")

'Create an ADO recordset object
Set rsUpdateEntry = Server.CreateObject("ADODB.Recordset")

'Initialise the strSQL variable with an SQL statement to query the database with
strSQL = "SELECT * FROM tblInfo WHERE InfoID='"& InfoID &"' "

'Set the cursor type we are using so we can navigate through the recordset
rsUpdateEntry.CursorType = 2
```

```
'Set the lock type so that the record is locked by ADO when it is updated
rsUpdateEntry.LockType = 3

'Open the recordset with the SQL query
rsUpdateEntry.Open strSQL, objConn

'Update the record in the recordset
rsUpdateEntry.Fields("Title") = Request.Form("title")
rsUpdateEntry.Fields("Description") = Request.Form("description")
rsUpdateEntry.Fields("Info") = Request.Form("info")

'Write the updated recordset to the database
rsUpdateEntry.Update

'Reset server variables
rsUpdateEntry.Close
set rsUpdateEntry = Nothing
Set objConn = Nothing

'Return to the update select page in case another record needs updating
Response.Redirect "confirm.asp?path=editinfo.asp&msg="+Server.URLEncode
("The page has been successfully updated!")
%>
```

Figure 6.6: The Coding for updateinfo_entry.asp

6.4 CODING STYLE

Good coding practices are applied in the Pelitawanis TNB Portal system programming. Areas of focus include system consistency, maintainability, and readability. The purpose of these techniques is to make the programming much clearer, more understandable, more debuggable, and more maintainable. The following subchapters will elaborate in further details some of the important coding style implemented in the system development.

6.4.1 Include Script Files

The Include Script files are used to insert contents into ASP pages. This is useful when a section of hypertext markup language or other codes need to be inserted or included in the pages numerous times. The include instruction syntax is shown below:

<! -- #include file = *"the source of the Include Script file"* -->

Moreover, this means that any updates to the Include Script file will automatically be reflected in every page that uses that specific file. This eases the tedious work of updating all the affected ASP pages when changes need to be done.

6.4.2 Formatting and Indenting Codes

Formatting and indenting codes is constantly associated with good coding practices. A code that is written without proper formatting or indenting will function or work as well as a formatted code. However, this can make it exceptionally difficult to see where and error is coming from and thus makes the task of troubleshooting and debugging much more difficult to perform. The maintenance of the code will also present a challenge when a change or adjustment occurs.

Indentation principally makes the structure of the code stand out and easier to read. This eventually will help in detecting and removing common programming errors. A convention for the indent size is set and uniformly applied throughout the system coding. The Tab key was used to create the standardized indentation. A sample of a formatted and indented code is shown in Figure 6.7 (please refer to the next page).

```
Public Sub SaveToDatabase(ByRef oField)
        If LenB(FileData) = 0 Then Exit Sub

        If IsObject(oField) Then
            oField.AppendChunk FileData
        End If
End Sub
```

Figure 6.7: A Sample of Formatted and Indented Code

6.4.3 Commenting Codes

Comments are not part of the program code and it does not command any program executions. Comments usually will slow down page execution because the script interpreter has to read and then skip the comment lines each time it comes across a comment. Despite this shortcoming, comments are still applied as a part of common practice in documenting the system's coding. This is to help the author understand what and why the coding was written, especially when returning to it after a long time. This also makes it easier for other people especially collaborating programmers to understand the coding.

Comments are included before each block of code describing its purpose. Comments must also be included for any line of code of the meaning of the code might present some ambiguity to someone. For Active Server Pages, the single quotation mark is used as the prefix of a comment. Figure 6.8 shows the comments inserted in the part of the system coding (please refer to the next page).

```
'Dimension variables
Dim rsMemberList    'Holds the recordset for the records in the database
Dim strSQL          'Holds the SQL query to query the database

'Create an ADO recordset object
Set rsMemberList = Server.CreateObject("ADODB.Recordset")

'Initialise the strSQL variable with an SQL statement to query the database with
strSQL = "SELECT * FROM tblMember;"

'Open the recordset with the SQL query
rsMemberList.Open strSQL, objConn
```

Figure 6.8: A Sample of Comments with Matching Codes

CHAPTER 7: SYSTEM TESTING AND EVALUATION

7.1 SYSTEM TESTING

System testing is one of the key quality control and assurance measures performed in different levels throughout the system development. Testing is primarily carried out to ensure that programs are executed accurately and confined to the requirements specified. It is meant to detect heretofore-unknown problems and not to demonstrate the perfection of the system itself.

The objectives of system testing are as follows:

(a) Testing is a process of executing a program with the intent of finding an error.

(b) An effective test case is one that contains unexpected testing record sets with a high probability of finding and detecting an as-yet-undiscovered error during the program design and development phases.

(c) A successful test is one that constantly provides new challenges to its programmers over time.

Testing involves operation of the system under controlled conditions and evaluating the results. These controlled conditions should include both normal and abnormal conditions. Testing is oriented with detection approach whereby intentional attempts are taken to make things go wrong to determine if things happen when they should not or things do not happen when they should.

7.2 STAGES OF TESTING

The testing process is implemented throughout the development of the Pelitawanis TNB Portal. It is implemented in stages as the system itself is composed of modules. The testing is composed of three distinct stages, namely Unit Testing, Integration Testing and System Testing. Figure 7.1 depicts the flow of the stages in testing.

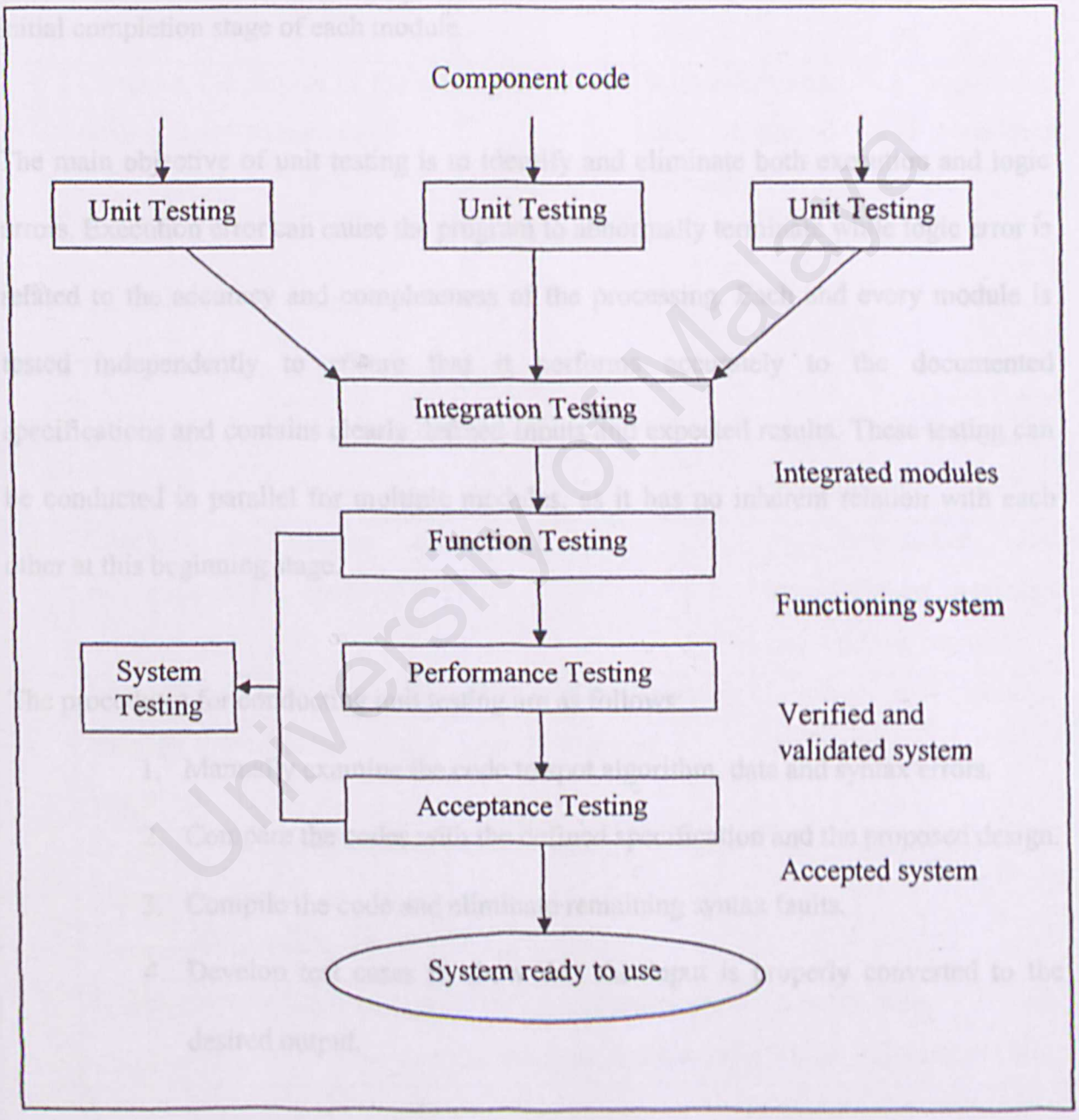


Figure 7.1: The Flow of Testing Stages

7.2.1 Unit Testing

Unit testing is the most micro scale testing where basic tests are performed at the component level to test particular functions or code modules. This is typically carried out by the programmer and not by testers, as it requires detailed knowledge of the internal program design and code. The author of this report has conducted the unit testing at the initial completion stage of each module.

The main objective of unit testing is to identify and eliminate both execution and logic errors. Execution error can cause the program to abnormally terminate while logic error is related to the accuracy and completeness of the processing. Each and every module is tested independently to ensure that it performs accurately to the documented specifications and contains clearly defined inputs and expected results. These testing can be conducted in parallel for multiple modules, as it has no inherent relation with each other at this beginning stage.

The procedures for conducting unit testing are as follows:

1. Manually examine the code to spot algorithm, data and syntax errors.
2. Compare the codes with the defined specification and the proposed design.
3. Compile the code and eliminate remaining syntax faults.
4. Develop test cases to show that the input is properly converted to the desired output.

Administration Module – General

Table 7.1: Unit Testing of the Administration Module - General

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of the Administration Menu page	No error	All information and hyperlinks are displayed and working correctly
2	Checking the display of the all other Administration pages	No error	All information and hyperlinks are displayed and working correctly

Administration Module – Login

Table 7.2: Unit Testing of the Administration Module – Login

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of Administration Login page	No error	All information and hyperlinks are displayed and working correctly
2	Logging in administrator by entering valid Username and Password	The Administration page is displayed	Login is working correctly
3	Logging in administrator by entering invalid or blank Username and Password	Corresponding error message is displayed	User is not logged in
4	Logging out administrator	The Administration Login Page is displayed	Administrator was successfully logged out

Administration Module – Add New Administrator

Table 7.3: Unit Testing of the Administration Module – Add New Administrator

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of the Add New Administrator page	No error	All information and hyperlinks are displayed and working correctly
2	Adding new administrator by entering new Username and Password	The confirmation (registration successful) page is displayed	Administrator is successfully added into the database
3	Adding new administrator by entering incorrect or unacceptable Username and Password	The error page is displayed	Administrator not added into the database

Administration Module – Change Administrator Password

Table 7.4: Unit Testing of the Administration Module – Change Administrator Password

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of the Change Administrator Password page	No error	All information and hyperlinks are displayed and working correctly
2	Changing administrator password by entering correct old and new Password	The confirmation (registration successful) page is displayed	Password is successfully changed
3	Changing administrator password by entering incorrect old and new Password	The error page is displayed	Password is not changed

Edit Portal Information Module

Table 7.5: Unit Testing of the Edit Portal Information Module

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of the Edit Information page	No error	All information and hyperlinks are displayed and working correctly
2	Updating portal information by inputting correct/valid information	The update information form and updated information confirmation page is displayed	Data retrieved from the database are displayed in the form for updating. Information is successfully updated
3	Updating portal information by inputting incorrect/invalid information	The update information form is displayed. Corresponding error message is displayed	Information is not updated

Member List and Update Module

Table 7.6: Unit Testing of the Member List and Update Module

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of the Member List page	No error	All information and hyperlinks are displayed and working correctly
2	Adding a new member by filling up correct information	The add member form is displayed and the added member confirmation page is displayed	Member is successfully added into the database

3	Adding a new member by filling up incorrect information in one of the fields each time	The add member form is displayed. Corresponding error message is displayed for the particular incorrect field	Member is not added. The cursor will focus on the particular field that caused the error
4	Updating member details by filling up correct information	The update member form is displayed and the update member information confirmation page is displayed	Data retrieved from the database are displayed in the form for updating. Member details are successfully updated into the database
5	Updating member details by filling up incorrect information in one of the fields each time	The update member form is displayed. Corresponding error message is displayed for the particular incorrect field	Member details are not updated. The cursor will focus on the particular field that caused the error
6	Deleting member from database	The delete member form and delete confirmation pages are displayed	Member is successfully deleted from the database

User Feedback Module

Table 7.7 Unit Testing of the User Feedback Module

No	Test Procedure	Output/Error	Analysis of Test Result and Solution
1	Checking the display of the User Feedback page	No error	All information and hyperlinks are displayed and working correctly
2	Adding new feedback from user with correct information	The add feedback form is displayed	User feedback is added into the database

3	Adding new feedback from user by filling up incorrect information in one of the fields each time	The add feedback form is displayed. Corresponding error message is displayed for the particular incorrect field	User feedback is not added into the database. The cursor will focus on the particular field that caused the error

7.2.2 Integration Testing

Integration testing is where combined modules that are dependent on one another are tested to determine if they function together as one. This is because integrated modules can be incorrect or inconsistent although the modules were individually proven satisfactory, as shown by the successful unit testing. Integration testing is specifically aimed at exposing the problems that arise from the combination of modules. Variables and parameters passing are all tested during this phase. Previously developed unit testing scripts can be combined to build an array of integration test cases without much additional effort. At this stage, record manipulation and traversing processes are also explicitly tested.

Integration testing ensures that valid linking and dynamic relationships are established between sub-modules and modules of the whole system. The testing is constructed and tested in small segments, where errors are easier to isolate and rectify. Each module in the system will be tested again to ensure that all the modules are functioning properly without errors.

The Pelitawanis TNB Portal system's integration testing is based on the bottom-up approach. This approach facilitates each component at the lowest level of the system hierarchy to be first tested as individual components. Then, the next components to be tested are those that call the previously tested ones. This is done repeatedly until all components are included in the testing.

Figure 7.2 shows an example of a constructed component testing hierarchy.

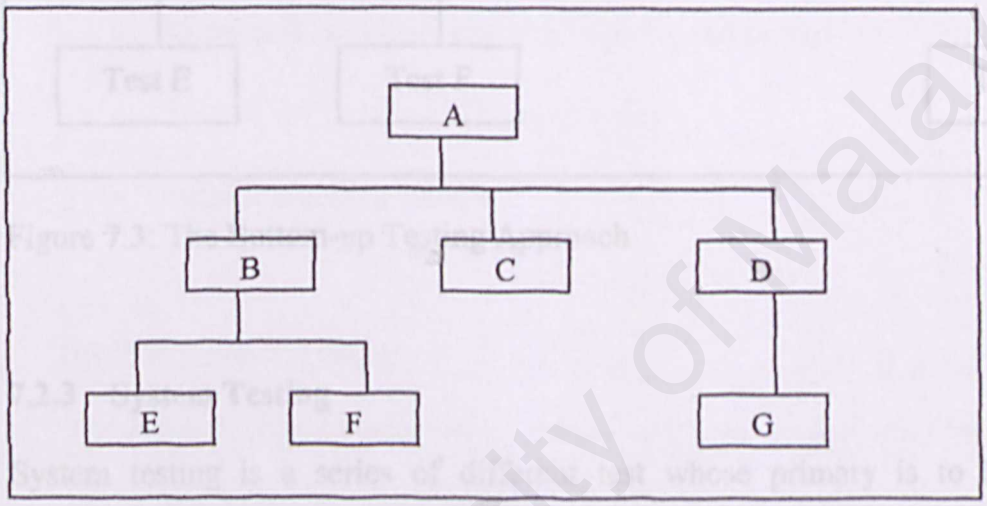


Figure 7.2: An Example of Component Testing Hierarchy

Figure 7.3 depicts the sequence of tests and their dependencies of bottom-up testing approach in the above constructed component-testing hierarchy (see next page).

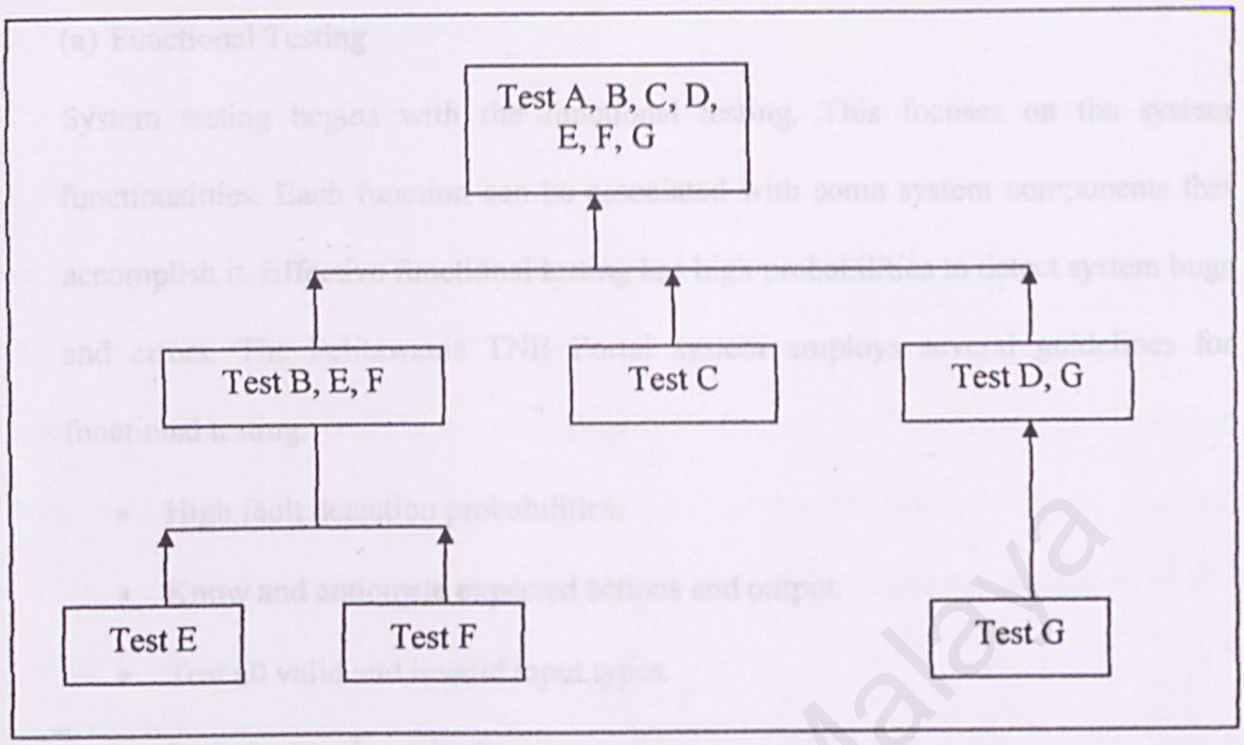


Figure 7.3: The Bottom-up Testing Approach

7.2.3 System Testing

System testing is a series of different test whose primary is to fully exercise the completed system. It is carried out on the entire integrated system as one unit to ensure that the entire system is validated. Its activities include testing of system performance, stress security, configuration sensitivity, usability, data integrity, error handling and recovery.

The purpose of the overall system testing is to ensure and verify that the system is functioning properly and all design and development objectives are met. Several steps were carried out to test the completed Pelitawanis TNB Portal system, including functional testing, performance testing and acceptance testing.

(a) Functional Testing

System testing begins with the functional testing. This focuses on the system functionalities. Each function can be associated with some system components that accomplish it. Effective functional testing has high probabilities to detect system bugs and errors. The Pelitawanis TNB Portal system employs several guidelines for functional testing:

- High fault detection probabilities.
- Know and anticipate expected actions and output.
- Test all valid and invalid input types.
- Include stopping criteria.

(b) Performance Testing

The purpose of the performance testing is to address the non-functional requirement of the system. System performance is measured using performance objectives set by potential users. Areas such as the accuracy of retrieving data, query speeds in record retrieval, inter-module communication speed and file loading from the database are carefully examined.

(c) Acceptance Testing

After completing functional and performance testing, the system has verified that all requirements specified are fulfilled in various stages of its development. Acceptance testing is finally carried out to determine whether the system is really usable or capable of meeting the user's performance expectations and requirements.

7.3 SYSTEM EVALUATION

System evaluation is a process of evaluating the capability and usability of the developed system. This phase involves several assessment procedures that will gauge the success level of the Pelitawanis TNB Portal. The most important evaluation is the evaluation by the end users, as they are the ones who will actually be using the system in the end. End user evaluation plays a big role in the system evaluation as it helps to detect not just errors and oversights, but also the limitations of the system. However, due to the logistics problem and time constraint, the author was not able to document the evaluation of the end users for inclusion in this report.

CHAPTER 8: CONCLUSION AND FUTURE ENHANCEMENT

8.1 PROBLEMS ENCOUNTERED AND ITS SOLUTIONS

The Pelitawanis TNB Portal has unambiguous and straightforward deliverables and definitions. However, the process of developing the system is as challenging and demanding as any other development projects. The developer faced various difficulties ranging from minor setbacks to some considerable problems but none intricate enough to put at risk the system development. The following subchapters will discuss the problem and approaches for solution in the Pelitawanis TNB Portal.

8.1.1 Problems in Selecting System Development Tools

There are many good and useful development tools available for the use of developing the Pelitawanis TNB Portal. However, not all of these are suitable as each tool has its own strengths and drawbacks. It must also be suited to the needs of the developer in this particular project, depending on the system requirements and needs. The task of choosing the right development tool is always something challenging and hard to do because this choice will affect the entire development process of the system. Furthermore, the developer's inexperience and lack of knowledge of the selected tools must also be taken into consideration.

In search of the best development tools that cater to the needs of the portal, the author analyzed the system requirements and strategizes some information finding methods to assist in this task. Authoritative electronic resources from the Internet, advises from

experienced lecturers and course mates and other professionals have helped finalize the development tools selection.

8.1.2 Problems in System Implementation

The problems encountered in the system implementation process mainly have to do with the system coding, which includes JavaScript, Visual Basic Script, Hypertext Markup Language, Cascaded Style Sheet and Active Server Pages Programming. These problems arose due to the author's lack of experience and exposure in these programming languages and also the limitation of these languages in certain ways. The author had to read many look up reference books and electronic resources in the Internet from time to time to seek solutions. The "first things first" approach was applied to comprehend the basic theories and fundamental concepts of the programming languages. This gradually builds up the foundation for clear programming comprehension and eventually provides the coding solutions for the Pelitawanis TNB Portal.

8.1.3 Problems Understanding the Error Messages

The author also encountered problems when trying to understand the error messages that were generated by Internet Information Services (IIS) 5.0 or other tools used to program the system due to the technicality of the messages and also the author's lack of knowledge and experience in this area. Most of the time, the messages are very vague and confusing. The messages can also be misleading, as the source of the error sometimes is not the one indicated by the compiler. This problem is gradually reduced when the

author's familiarity with the browser increases over time, as well as taking precautions such as always keeping back-up files in case of errors.

8.1.4 Retrieving and Inserting Data Into the Database

Manipulating information in a database is not an easy task for beginners. The author faced several challenges while using the SQL 2000 Server during the course of completing the system. Understanding how the database works and the specific rules and regulations as well as the language used in information retrieval and updating took up many hours and effort. However, this is gradually solved through various attempts, discussions with course mates and guidance from the lecturers.

8.1.5 Problems in Designing an Attractive Layout for the System

Coming up with an attractive and suitable design for the portal is also a challenge for the author. During the initial stages, a lot of time was spent trying out the software and getting familiar with it, as well as learning from tutorials online and from books. The author also looked at some samples of websites found on the Internet to get some ideas on how to design the portal. Several attempts were also done before the author could come up with a suitable design. Suggestions and critiques from other course mates and lecturers were also constructive in improving the overall design of the portal. The limited screen space for the portal after accommodating the SharePoint Portal Server also posed a problem for the author, as a banner could not be included in the design of the portal. However, after numerous attempts and improvisations a satisfactory design was finally obtained.

8.2 SYSTEM STRENGTHS

The following subchapters will highlight the system's strengths and features of the Pelitawanis TNB Portal.

8.2.1 Attractive and User-Friendly Graphical User Interface

A Graphical User Interface (GUI) is a computer-user interface that uses graphical screen images as well as typed text, with icons on the screen to replace many of the functions of the keyboard. It has become one of the most important developments in the information technology field over the past ten years or so. This is due to the fact that it can make the most of its ability to represent lots of information on the screen. The Pelitawanis TNB Portal was designed to achieve the single purpose of being user-friendly. GUI enables the "point and click" mechanism to perform its preset operations. Moreover, it has been proven as the most trouble-free and straightforward learning environment for most users.

8.2.2 Easy and Functional Content Management

The core of the Pelitawanis TNB Portal is the content management, which is the integration of the Administration components. The administration menu is restricted only to authoritative administrators. This is where the administrators can perform various data manipulation functions such as adding, deleting and updating information. The administrators can specifically edit the member list and also the information displayed in the portal. All this is done using user-friendly GUI interfaces by using the "click and point" mechanism. The administrators do not need to know where the database is, or how to access the information in the database or any specific language such as HTML or SQL.

8.2.3 Authorization and Authentication

Only authorized administrators can access the administration pages to make any changes to the information on the portal. The administrators must provide valid username and password in order to gain access into the administration menu. If the username and password is incorrect, an error message will be prompted and the user is redirected to the login page again. This will therefore ensure that only authorized changes are made to the portal.

8.2.4 Informative Messages and Pages

Appropriate error messages and alerts are very useful in assisting users when they make a mistake or are not familiar with the system. When users try to perform illegal actions, such as leaving a field on a form blank or entering an invalid data type, an error message will be prompted so that the user may be aware of the mistake. The system also provides confirmation messages to the user when tasks are completed, for example when a registration is complete or successful. Users will also need to be given adequate warnings before performing vital tasks such as deleting member records from the database to avoid accidental deletion of data. Overall, this will improve the system reliability.

8.3 SYSTEM CONSTRAINTS

Every system developed has its own limitations and constraints. The Pelitawanis TNB Portal is no exception. Although these setbacks confine the effectiveness and the efficiency of the system, various precautions have been taken to minimize the unwanted consequences. Moreover, these constraints can be addressed in future development or in system enhancements.

8.3.1 Limited Type of Information

When the idea of this portal initially proposed, the author wanted to put in various types of data or information in the portal to enrich the experience of its users. However, due to lack of resources such as an audiocassette or videotape of the Pelitawanis songs or activities, the author could not digitize the particular medium of information to be uploaded to the portal.

8.3.2 Cannot support direct search

Users cannot perform advanced tasks such as search and management of documents directly in the portal. The search is performed using the SharePoint Portal Server and not through the main portal interface. This might be confusing to users especially those not familiar with the SharePoint technology or do not possess a high level of computer skills.

8.3.3 Limited User-Directed Functions

This portal has not yet reached a stage where it will create a unique and customized experience for each of its users. This is because the functions of the portal and the

information that is stored in it are mostly general-purpose and do not require specific directions from users regarding the actions they want to take. Although this is not a great drawback, some users might feel that it is too impersonal and not as friendly as they want it to be.

8.4 FUTURE ENHANCEMENTS

This portal is not yet a "perfect" system and therefore future enhancements are of course expected to take place. The following sections discuss some of the suggested enhancements that can be incorporated into this system in the near future.

8.4.1 Support of Various Mediums of Information

This enhancement will allow users to experience many types of information from the usage of the portal, such as a video clip of the activities that were organized, songs that were composed for competitions and much more. This will make the portal a truly multi-media portal that would give users a rich web experience.

8.4.2 Incorporation of management functions

Functions that can assist the administrators (mainly the committee of the organization) in the administration of the organization can also be included in this portal to increase its effectiveness and usefulness. Minute's management system and document storing are some of the feasible modules that can be developed for this purpose.

8.4.3 Online registration

At the moment, members of the organization need to register as members by manual application using the forms that may be printed from the web or taken directly from the office. In future, online registration can be included so that users can enter in all the details needed to complete the form and then register online. The administrators can then process the application and can print out the completed form for record keeping purposes.

8.5 KNOWLEDGE AND EXPERIENCE GAINED

Throughout the whole development process of the portal, right from the beginning till the last minutes of the development and implementation process, the author has gained much invaluable experience that would greatly help in preparing for the working environment especially in the field of Information Technology.

A large portion of the theories learnt through the subjects offered while studying in university such as programming languages, database design and features, software engineering, and other knowledge were put into practical use and the author was able to increase understanding and comprehension of these subjects through this project.

The experience of using software and other application programs such as Macromedia Dreamweaver MX, Macromedia Flash MX, Adobe Photoshop 6.0, and techniques in designing banners, buttons, simple animation and others were also very useful and interesting. The author also learnt how to write programs in languages such as Active Server Pages, JavaScript, Visual Basic and SQL.

Apart from this, the author also learnt how to work independently to solve the various problems and challenges that came up during the course of developing the portal as well as handling the searching of information for the development of this portal.

The author's communicating skills were also polished in the process of dealing with all the people involved one way or another in the development of this system. Course mates, the project supervisor and moderator and users of the system all had a part to play in the development of the portal and the author's communication and rapport with is important to ensure that the end result will be the best possible for all concerned.

8.6 CONCLUSION

Overall, the author was able to come up with a satisfactory portal that contains the proposed modules and achieved the objectives stated in the proposal. The modules have been successfully integrated and fulfilled both the functional and non-functional requirements.

The current version of the developed system has a good number of strengths but also contains limitations and drawbacks. The system has a high potential to be further enhanced and to be made more effective and efficient in the future.

The author has learnt a lot during the whole development process, and many learning opportunities and other knowledge were made available to the author. Skills such as communication and how to collaborate with others were also picked up besides technical

skills like web-based programming, designing techniques, database manipulation and scripting.

It is hoped that with its strengths and limitation balanced, this version of the Pelitawanis TNB Portal will be useful to the target users and will be able to assist them in performing their tasks as well as provide an interesting online experience to them.

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ABOUT Pelitawanis TNB Portal USER MANUAL

This manual provides step-by-step instructions of the system operations and procedures.

This manual comprises three (3) parts as follows:

Part 1: Introduction

Part 2: System Requirements

Part 3: Getting Started with Pelitawanis TNB Portal

PART 1: INTRODUCTION

The Pelitawanis TNB Portal is a Web-based information system that emphasizes on information and resource sharing of information regarding the Pelitawanis TNB Organization and other related information. This portal is designed for use by the interested public in general and the Pelitawanis TNB members (specifically Butterworth Branch members) in particular.

The main functions of the Pelitawanis TNB Portal system are as follows:

- Provide a user friendly and easy to use facility for administrators to add, delete, or update the member details and other information contained in the portal that have been uploaded in the database.
- Allow both administrators and other users to view the most updated information regarding the organization, its members and activities.

PART 2: SYSTEM REQUIREMENTS

2.1 Run-Time Requirements

Hardware configuration requirements to run Pelitawanis TNB Portal system

- At least IBM compatible Intel Pentium II or III Processor
- At least 64MB RAM
- Available 3.0GB or above hard disk space
- Other standard desktop PC compliance

Software configuration requirements to run Pelitawanis TNB Portal system

- Windows 98, Windows 2000, Windows NT, Windows XP
- Personal Web Server 4.0, Internet Information Services 5.0
- Microsoft SQL Server 2000

- Internet Explorer 5.0 or above

PART 3: GETTING STARTED WITH Pelitawanis TNB Portal

The following subchapters describes in detail the processes and procedures of all the modules in the Pelitawanis TNB Portal.

3.1 Administration Module

The Administration Module covers the administrator login, add new administrator, and change password functions.

3.1.1 Login and Logout

Authorized administrators can login to the Administration Menu page to perform administration tasks such as adding, deleting, and updating member information as well as the portal information by logging in at the Administration Login page. All information that can be changed is accessed via the buttons found on the Administration Menu page. Figure 1 and Figure 2 depicts the Administration Login page and Administration Menu page respectively.

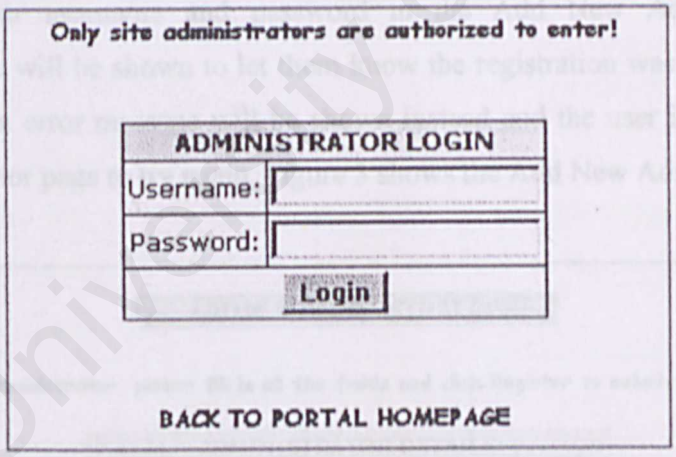

Figure 1: The Interface of the Administration Login Page

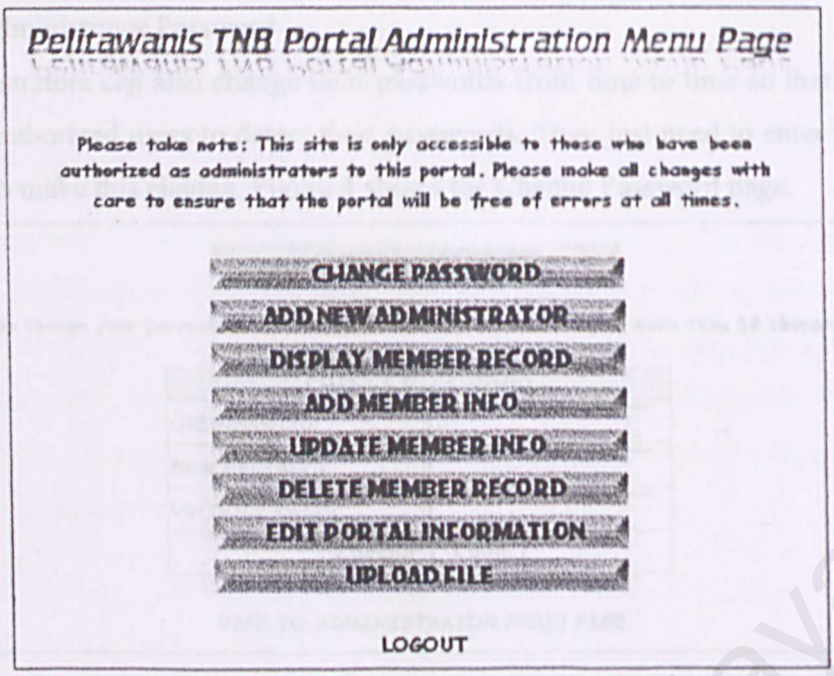

Figure 2: The Administration Menu Interface

3.1.2 Add New Administrator

New administrators for the portal can also be added in this module. The new administrators just need to register their username and password in the Add New Administrator page. A confirmation message will be shown to let them know the registration was successful. However, if there is an error, an error message will be shown instead and the user is brought back to the Add New Administrator page to try again. Figure 3 shows the Add New Administrator page.

Figure 3: The Add New Administrator Interface

3.1.3 Change Administrator Password

Existing administrators can also change their passwords from time to time so that it will be more difficult for unauthorized users to detect their passwords. They just need to enter in their old and new password to make this change. Figure 4 shows the Change Password page.

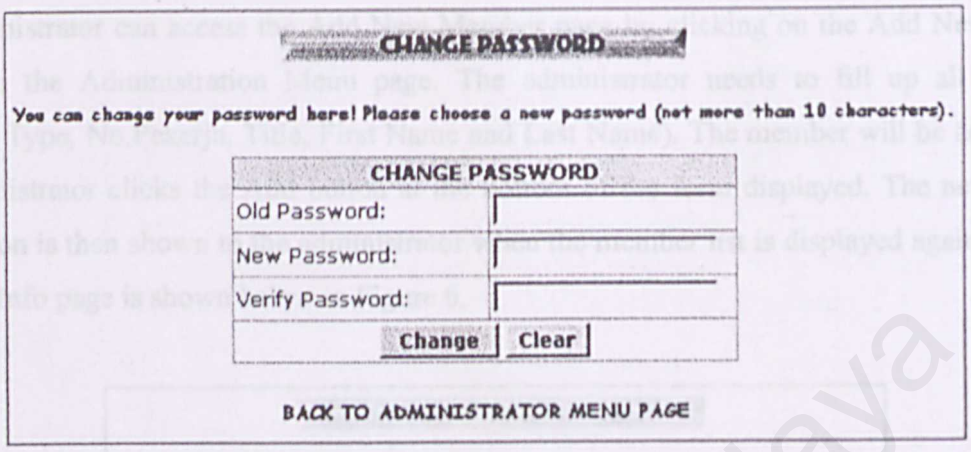

Figure 4: The Change Password Interface

3.2 Member List and Update Module

The Member List and Update module covers the display of member records, the adding of new members, the updating of existing member information and also the deletion of member record from the database.

3.2.1 Display Member Record

When the administrator wants to check the latest member list, the administrator only needs to click on the Display Member Record button and the list will be shown. Figure 5 illustrates the Display Member Record page.

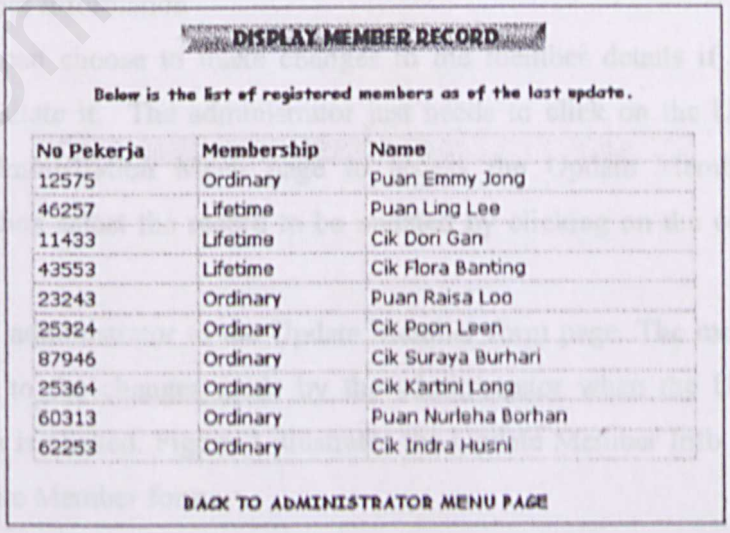

Figure 5: The Interface of the Display Member Record Page

3.2.2 Add New Member

First of all, the administrator needs to check if the details of the particular member already exist in the database or not. If it does not exist, then the administrator needs to add the member details into the Pelitawanis TNB Portal database.

The administrator can access the Add New Member page by clicking on the Add New Member button on the Administration Menu page. The administrator needs to fill up all the fields (Member Type, No.Pekerja, Title, First Name and Last Name). The member will be added when the administrator clicks the Add button at the bottom of the form displayed. The new member information is then shown to the administrator when the member list is displayed again. The Add Member Info page is shown below in Figure 6.

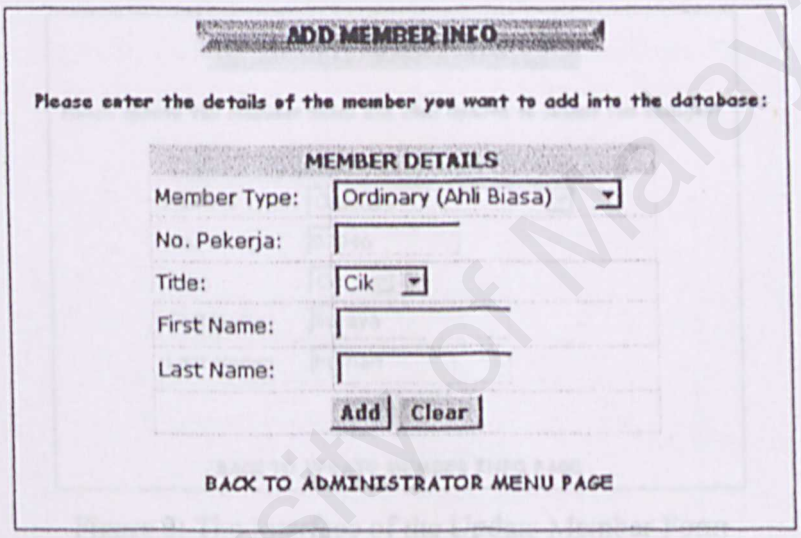

Figure 6: The Interface of the Add Member Info Page

3.2.3 Update Member Information

The administrator can choose to make changes to the member details if and when there are changes that necessitate it. The administrator just needs to click on the Update Member Info button on the Administration Menu page to access the Update Member Info page. The administrator can then select the record to be updated by clicking on the corresponding update field.

This will bring the administrator to the Update Member form page. The member record will be updated according to the changes made by the administrator when the Update button at the bottom of the form is clicked. Figure 7 illustrates the Update Member Info page while Figure 8 illustrates the Update Member form.

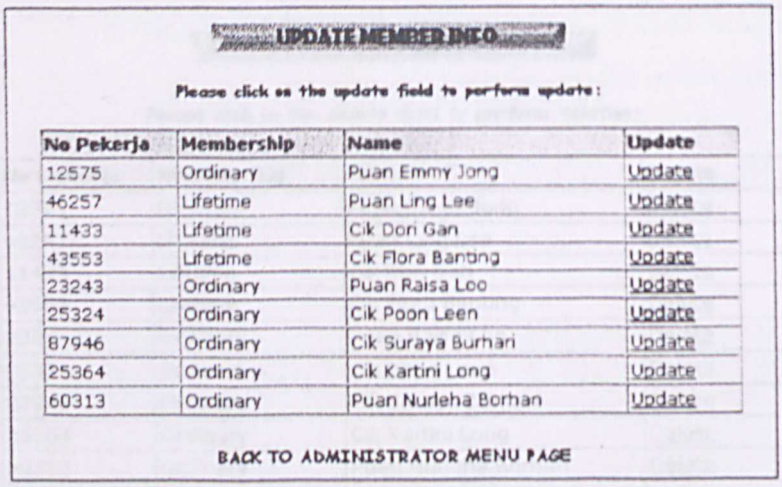

Figure 7: The Interface of the Update Member Info Page

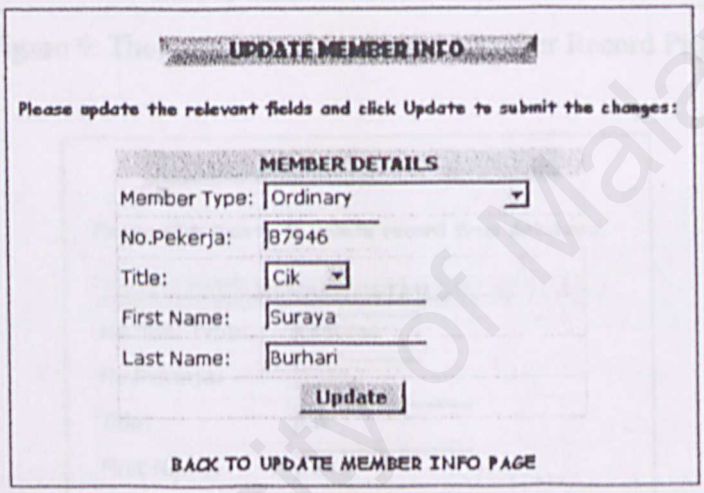

Figure 8: The Interface of the Update Member Form

3.2.4 Delete Member Record

The administrator can also delete a member record from the member list. The Delete Member Record page can be accessed in the same way as the Add Member Info and Update Member Info page. The administrator selects the record to be deleted from the Delete Member Record page. Then the Delete Member form will be shown. When the administrator clicks on the Delete button, a message alert will confirm whether the administrator wants to delete the record just in case the Delete button was accidentally clicked on. This is to prevent records from being accidentally erased because the delete action cannot be undone. Figure 9 and 10 illustrates the Delete Member Record page and Delete Member form respectively. The member record will be deleted when the administrator clicks the Delete button. (See Figure 9)

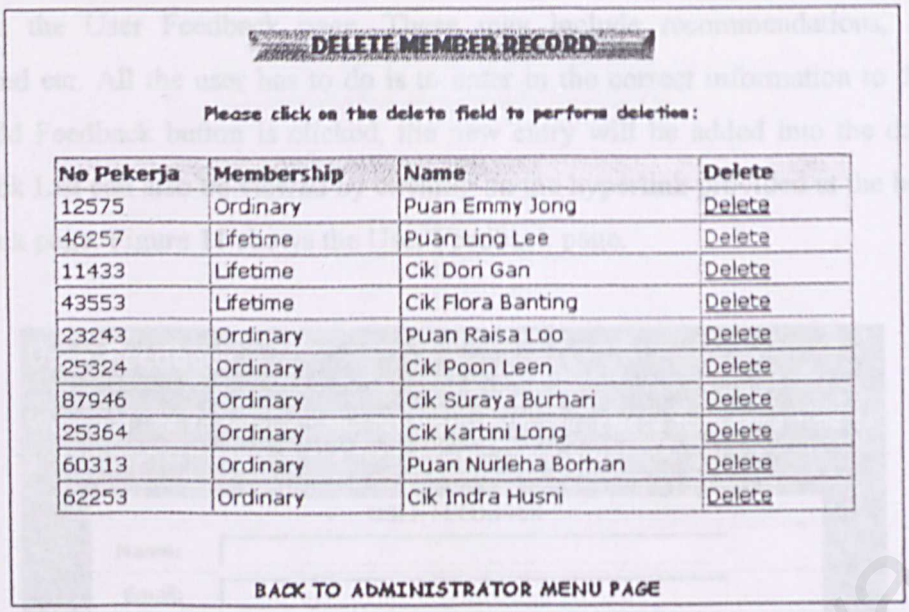

Figure 9: The Interface of the Delete Member Record Page

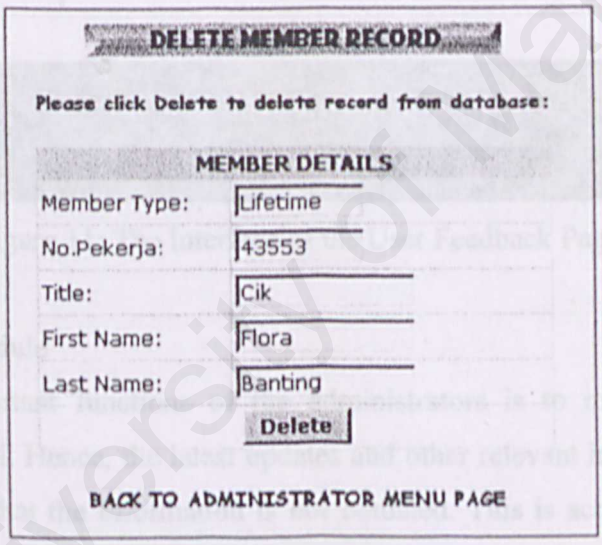

Figure 10: The Interface of the Delete Member Form

3.3 User Feedback Module

The User Feedback module is for ordinary users of the portal and is not considered part of the administration menu.

3.3.1 Add User Feedback

Users who visit the Pelitawanis TNB Portal are encouraged to give their comments and feedback to the administrators and to the organization in general by posting their name, email address and

comments in the User Feedback page. These may include recommendations, suggestions, complaints and etc. All the user has to do is to enter in the correct information to the page and when the Add Feedback button is clicked, the new entry will be added into the database. The User Feedback List can also be viewed by clicking on the hyperlink provided at the bottom of the User Feedback page. Figure 11 shows the User Feedback page.

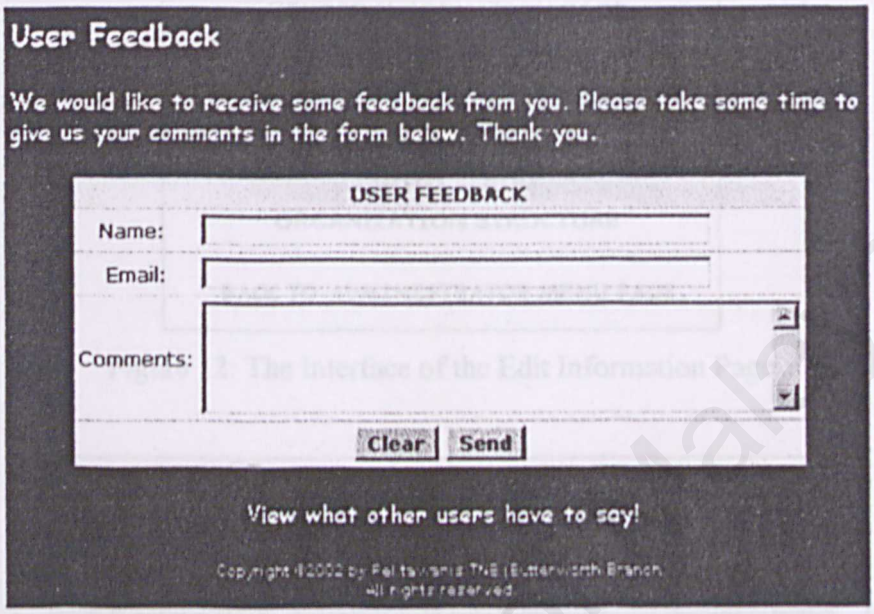

Figure 11: The Interface of the User Feedback Page

3.4 Edit Information Module

One of the most important functions of the administrators is to maintain and update the information on the portal. Hence, the latest updates and other relevant information can be added to the portal to ensure that the information is not outdated. This is achieved by using the Edit Information module.

3.4.1 Edit Information

Administrators may also edit the information found in various pages in the portal. On the Administration Menu page, administrators just need to click the Edit Information button and the Edit Information page will be displayed. The administrator can then choose to edit whichever information that needs to be changed or updated by choosing the relevant page. For example, if the administrator chooses to edit the main page, the Edit Main Page interface will be shown and the administrator can choose which information to update by clicking the respective update field. The procedure is the same for all the other pages in the portal. Figure 12 depicts the Edit Information page while Figure 13 shows the Edit Main Page interface.

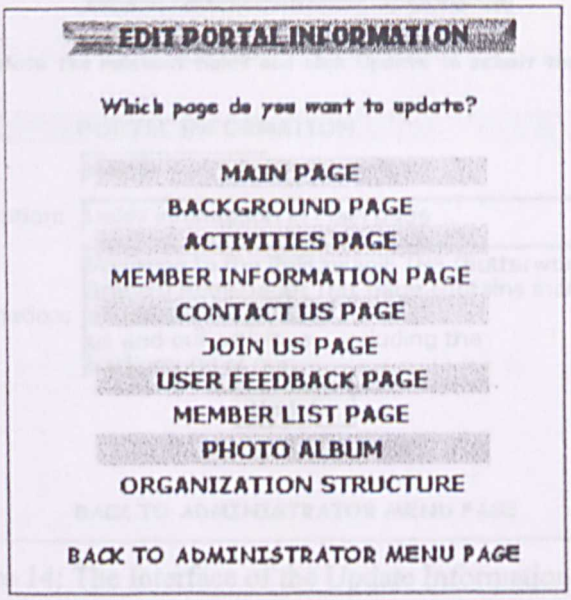

Figure 12: The Interface of the Edit Information Page

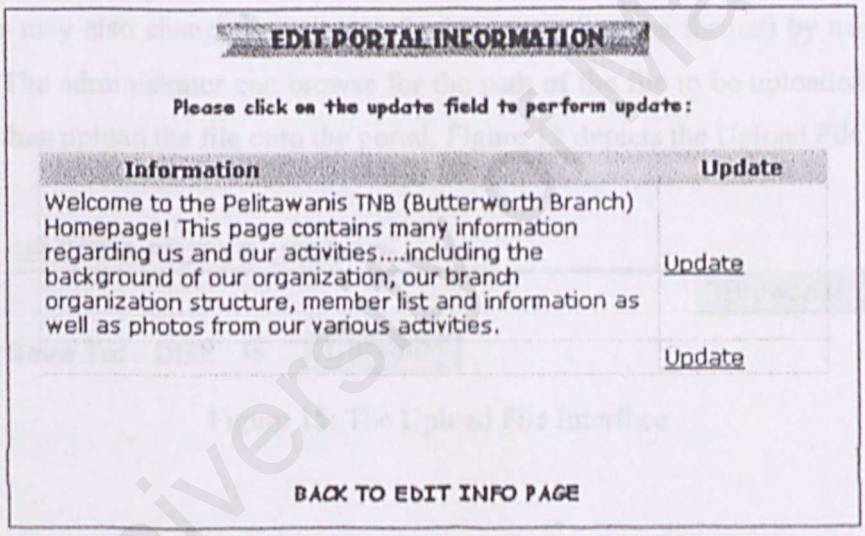

Figure 13: The Interface of Edit Main Page

This will take the administrator to the next page, which is the Update Information form (Figure 14). The administrator can make the relevant changes and when the Update button is clicked, the information is updated in the database and a confirmation message will be shown to the administrator to let them know that the update was successful.

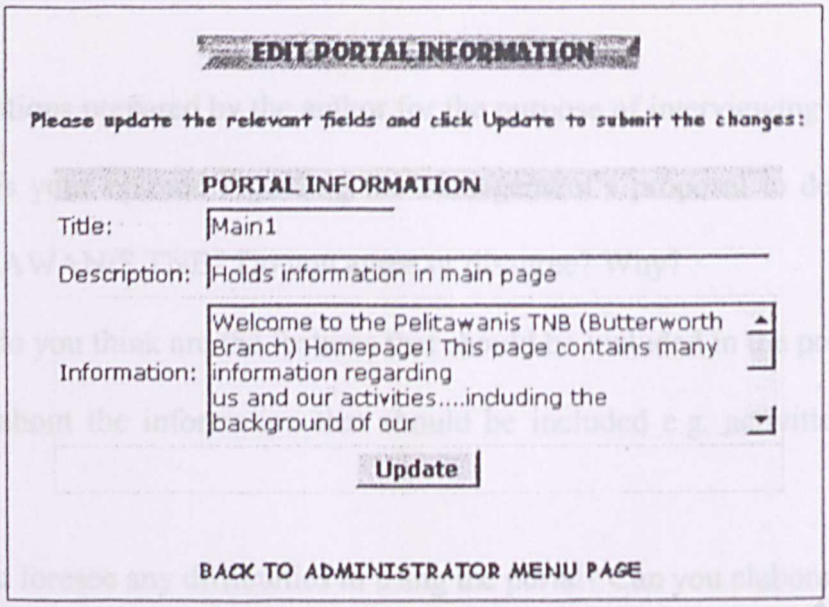

Figure 14: The Interface of the Update Information Form

3.4.2 Upload File

Administrators may also change the organization structure (in jpeg format) by using the Upload File function. The administrator can browse for the path of the file to be uploaded in the Upload File page and then upload the file onto the portal. Figure 15 depicts the Upload File interface.

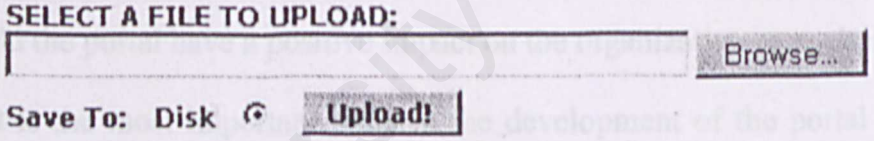

Figure 15: The Upload File Interface

Appendix A

Interview questions prepared by the author for the purpose of interviewing the end-users

1. What is your opinion regarding the management's proposal to develop a portal for PELITAWANIS TNB? Do you agree or disagree? Why?
2. What do you think are the features that should be included in the portal?
3. What about the information that should be included e.g. activities, announcements etc.?
4. Do you foresee any difficulties in using the portal? Can you elaborate further?
5. Are there any suggestions that you have concerning the portal, in regards to the exposure and training provided to the users prior to the implementation of the portal?
6. Do you agree that the development of this portal would benefit the users?
7. Do you think that this portal would be able to help you or the organization in organizing its activities, disseminating information and registering new members?
8. Would the portal have a positive impact on the organization as a whole?
9. What is the most important issue in the development of the portal to you e.g. nice interface, user-friendly, simple, meets your needs, and etc.?
10. Any other suggestions?